Report of the Comptroller and Auditor General of India

for the year ended March 2006

Union Government (Defence Services)
Air Force and Navy
No. 5 of 2007
Performance Audit

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PREFACE

This Report for the year ended March 2006 has been prepared for submission to the President under Article 151 of the Constitution. The report contains results of performance audits of the operation and maintenance of an aircraft fleet in IAF and Provisioning and Procurement activities at HQ Maintenance Command, Base Repair Depots and Equipment Depots. This report also includes a performance audit of management of equipment in Naval Dockyards, Mumbai and Visakhapatnam.

OVERVIEW

This Audit Report includes matters arising out of performance audits of operation and maintenance of a fleet of transport aircraft of the Indian Air Force; provisioning and procurement function of the IAF's maintenance command and depots and of management of equipment held by two Naval Dockyards of the Indian Navy.

Operation and maintenance of an aircraft fleet in the Indian Air Force

Aircraft "A" are medium tactical transport aircraft primarily used for transport of troops and cargo; para trooping; supply dropping and casualty evacuation. IAF contracted purchase of 118 such aircraft and inducted the same into squadron service between 1984 and 1991.Facilities for maintenance of airframes were created at BRD "X" and for aero-engines at BRD "Y". A performance audit of the aircraft fleet's operation and maintenance during the period 2001-06 was conducted. The audit focused on operational aspects such as achievement of flying tasks; assigned roles; serviceability targets and availability of operational manpower. Besides, with regard to aircraft maintenance the focus was on adequacy and efficient utilization of repair and maintenance facilities existing in the IAF for the aircraft.

The important audit findings are:

- The serviceability levels achieved by the aircraft fleet were low and the percentage of Aircraft on Ground (AOG) was high indicating low efficiency of operation of the fleet. In comparison to the capacity of the aircraft, payloads carried were also low.
- Aircraft were predominantly used for routine and miscellaneous tasks at the expense of primary air maintenance and training tasks.
- Eight aircraft were modified for "VIP Role" without approval of government thereby diverting them from operational tasks. Further, the modification also lacked justification as a separate specialized communication squadron with adequate aircraft for use by VIPs already existed.
- Paratrooping is one of the primary tasks of Aircraft 'A'. In the Paratrooping School and in a training centre set up to impart training, most of the courses showed shortfall in achievement of targeted output. Envisaged conversion courses for which six aircraft were provided to the School, were not held at all during the past five years.
- There were delays in conducting overhauls and repair both by the engine and airframe overhaul facilities.
- BRD 'Y' failed to complete a large number of allotted repair and overhaul tasks during the last 5 years due to shortage of spares which had resulted from delayed and inadequate provisioning. Consequently, 120 engines had to be sent abroad to the

OEM for overhauls at a cost of Rs.64.12 crore. Besides, several of the engines overhauled by this depot had to be prematurely withdrawn.

- Establishment of repair and overhaul facilities for airframes at BRD 'X' was considerably delayed and some facilities are still to be established. Further, a project for creating facilities for overhaul of turbo-generators at HAL, Koraput, approved in 2001, is yet to be completed as of October 2006.
- There were delays in completing second line servicing in a significant percentage of cases due to shortage of spares.
- Though, indigenisation of mandatory and non-complex spares at BRDs has made significant progress, commercial exploitation has been limited.
- Inability to obtain technology for life extensions of engines beyond 4000 hours would make IAF completely dependent for overhauls on the OEM in a few years.

Provisioning and procurement activities at HQ Maintenance Command (HQMC) and Depots

Provisioning and procurement together constitute the cornerstone of IAF's materials management system. Earlier, all provisioning and procurement activities of stores were centrally undertaken by Air HQ but in September 1995, Government accorded sanction for transfer of provisioning/procurement activities of stores to HQMC and Depots in a phased manner. Audit examined provisioning and procurement activities undertaken by HQMC, three Base Repair Depots (BRDs) and three Equipment Depots (EDs) during 2001-2006.

Significant audit findings are:

- There was abnormal delay in implementation of the plan for decentralization of procurement activities to Maintenance Command and Depots. Even after more than a decade, half of the provisioning and procurement activities continue to be centrally controlled by Air HQ.
- Provisioning reviews conducted by HQMC for making procurements under delegated powers were delayed. HQMC failed to complete 70 per cent of the review work within the prescribed time schedule.
- Procurement from Government agencies was low and HQMC procured items from trade at the rates higher than those offered by the government agencies entailing avoidable expenditure of Rs 2.33 crore.
- There was lack of competitiveness in the procurement process due to limited vendor base being maintained by HQMC and Depots.

- Indiscriminate changes in specification of clothing and general items of stores were made without reference and approval of the government. These changes resulted in reducing competition and avoidable extra expenditure and delay in procurement.
- Excessive local purchase of clothing and MT stores were undertaken indicating HQMC not able to provide the required items in time to the dependent IAF units/formations.
- Poor level of demand satisfaction and large number of outstanding AOG demands and other demands for spares disclosed weakness in provisioning activities conducted by HQMC.
- Project for online management of material inventory started in 1995 suffered from time and cost over-runs and is yet to become fully functional.
- Devolution of provisioning and procurement responsibilities to HQ MC was slow and halting and as such IAF was deprived of benefits envisaged from such devolution.

Management of Equipment in Naval Dockyards, Mumbai and Visakhapatnam

Naval Dockyards, located at Mumbai and Vishakapatnam, primarily undertake "refits" and repairs of naval ships and submarines. These Dockyards hold a large number and diverse range of equipment to conduct repairs and refits. Effective management of equipment thus has a critical bearing on the operations of these dockyards. A performance audit was conducted to study various aspects of the management of these equipment such as maintenance, operation and utilization, adequacy, replacement and augmentation of installed equipment in the dockyards. The period covered by this study is five years starting from 2001-02. The principal findings arising from the audit are given below:

- Funds provided for purchase of equipment were not fully utilized by the dockyards.
- Several old and obsolete equipment were awaiting replacement due to shortcomings in the planning and contracting of equipment replacement.
- There were delays in creating repair and maintenance facilities for newly acquired naval vessels.
- Maintenance of equipment in both the dockyards was reactive to breakdowns and defects. Breakdown repairs took considerable time to complete even where these were off-loaded to trade.
- The dockyards undertook procurement of spares only when repairs were on hand. These procurements, however, took considerable time to complete.
- Records of machine operation and use were either not maintained or inadequately kept. Consequently, performance of equipment could not be monitored effectively by the dockyard managers.

MINISTRY OF DEFENCE

INDIAN AIR FORCE

OPERATION AND MAINTENANCE OF AN AIRCRAFT FLEET IN IAF

CHAPTER I: Operation and maintenance of an aircraft fleet in the Indian Air Force

Highlights

- **Efficiency of operation and utilization of Aircraft 'A' fleet was low on account of low serviceability rate and high percentage of Aircraft on Ground (AOG) indicating inadequacies in repair and maintenance support. Payloads carried were also low as compared to the capacity of the aircraft.**

(Paragraph 1.6.1.1 & 1.6.1.2)

- **Aircraft were used for routine and miscellaneous tasks by diverting them from their primary roles of air maintenance and training. Of the total flying hours utilized by six squadrons/units, only 33 *per cent* were used for primary role of air maintenance and training, and the balance 67 *per cent* were spent for routine tasks and miscellaneous duties resulting in shortfall of 43 *per cent* in achieving air maintenance task and 58 *per cent* in training.**

(Paragraph 1.6.1.3)

- **In Paratrooping School, most of the courses relating to para trooping showed shortfalls in achievement of target outputs. Envisaged Conversion Courses, for which six aircraft were provided, were not held at all in the past five years.**

(Paragraph 1.6.1.4)

- **Eight aircraft were modified for "VIP Role[1]" without approval of the Government. Modification of aircraft diverted them from operational tasks and reduced their passenger and cargo carrying capacity. Such modification also lacked justification as a separate specialized communication squadron with adequate aircraft for use by**

[1] VIP Role – For use by VIPs and other entitled persons

VIPs already existed. Large scale diversion of serviceable air craft for VIP/Other Entitled Persons use affected availability of air craft for operation purposes.

(Paragraph 1.6.1.5)

- There was an overall shortage of pilots ranging from 13 to 22 *per cent* during the period of review. At the same time there was an excess of navigators and flight engineers. This indicates an imbalance in manpower deployment with respect to norms fixed per Aircraft 'A'.

(Paragraph 1.6.1.6)

- There was considerable delay in setting up repair and overhaul facilities for airframes at BRD 'X'. Deficiencies in the facilities still exist as some test rigs could not be installed. Full capability for overhaul of landing gear did not exist at the BRD, necessitating overhauls abroad.

(Paragraph 1.6.2.1)

- The project for creating a facility for overhaul of turbo-generators at HAL, Koraput, conceived in 1999 and approved in 2001, is yet to be completed as of October 2006. In the interim, generators continue to be sent abroad for overhaul involving additional expenditure.

(Paragraph 1.6.2.2)

- Indigenisation of mandatory and non-complex spares at BRDs has made significant progress. However, commercial exploitation has been limited.

(Paragraph 1.6.2.5)

- Servicing of aircraft at 300 hours and 900 hours took much longer than periods of down time prescribed in a significant percentage of cases due to shortage of spares.

(Paragraph 1.6.2.6)

- **Satisfaction of AOG demands for spares and rotables were delayed in most cases leading to a large number of aircraft remaining AOG for long periods.**

(Paragraph 1.6.2.7)

- **Achievement with regard to engine overhauls and repairs at BRD 'Y', during the last 5 years were considerably lower than tasks fixed. This was due to shortage of spares. Audit examination revealed that these shortages resulted from delayed and inadequate provisioning for the spares leading to 120 engines being sent abroad to the OEM for overhauls at a cost of Rs.64.12 crore.**

(Paragraph 1.6.2.8)

- **Several cases of premature withdrawals of overhauled engines and considerable delays in conducting overhauls and repair both by the engine and airframe overhaul facilities provide evidence of inefficiencies in operations.**

(Paragraph 1.6.2.9 & 1.6.2.10)

- **Inability to obtain technology for life extensions of engines beyond 4000 hours will make IAF completely dependent for overhauls on the OEM. This will make the IAF's overhaul facilities redundant and weaken IAF's position while negotiating charges and other terms for engine overhauls.**

(Paragraph 1.6.2.17)

Summary of recommendations

- Repair and maintenance services combined with spare availability need improvement so that aircraft serviceability is increased and instances and duration of AOG are reduced.

- Use of high capacity aircraft for carrying low loads would need review by IAF keeping in view the high operating cost of the aircraft and availability of other smaller transport aircraft and other modes of transport.

- Allocations of flying tasks should correspond closely to the primary roles of the aircraft. This is especially for Air Maintenance and training role of the units. Achievement of these tasks needs to be closely monitored.

- Proactive steps should be taken to improve utilization of the capabilities of para trooping school in consultation with user agencies.

- Operational manning in units should be reviewed so that they are in consonance with tasks allocated to units.

- Improvements may be brought about in maintaining flight details and in control of flight manifests.

- Project management and monitoring should be accorded priority so that facilities needed to support aircraft serviceability are created timely and are designed to deliver full functionality.

- Bottlenecks on utilizing the capacity of repair and maintenance facilities arising out of shortage of spares should be addressed through careful and prompt provisioning and procurement.

- The quality of services and the level of efficiency in repair and maintenance facilities should be stepped up to eliminate delays, instances of premature withdrawals and use of man hours beyond norms.

1.1 Introduction

Aircraft 'A' are medium tactical transport aircraft (METAC) primarily used for transport of troops and cargo; para trooping; supply dropping and casualty evacuation. IAF contracted procurement of 118 Aircraft 'A' and 64 spare engines at an aggregated cost of Rs.495 crore between 1981 and 1987. These aircraft were inducted into squadron service between 1984 and 1991. Over the years thirteen aircraft were lost in flying accidents and the present inventory of IAF is 105 Aircraft 'A'. These are being operated from different locations through six IAF squadrons, one para trooping school, one Air Force Station and one Training School.

1.1.1 Total Service Life

The aircraft consists of aero engines and airframe, which require maintenance and overhaul at prescribed intervals. Airframe of Aircraft 'A' had an initial

calendar life of 15 years/20000 flying hours/ 15000 landings and Time Between Overhaul (TBO) was 6 years/4000 flying hours/3000 landings. As Total Technical Life (TTL) of airframes, both in terms of landing and flying hours were not fully utilized, the technical life of the Airframe was extended indigenously from 15 to 18 years in January 1999 and again from 18 to 25 years in November 2001. Air HQ (June 2006) stated that the designer of the Aircraft 'A' had been approached for life extension of airframe further to 25 years for which OEM has made a proposal, which is still under consideration.

The service life of aero engines was 3000 flying hours and the TBO was 1000 hours. In 1994-95, the service life of engine was extended from 3000 to 4000 flying hours and TBO was increased from 1000 to 2000 flying hours. In 2003 and 2005, contracts have been entered into with the OEM for full overhaul alongwith extension of life of the engines up to 6000 hours. The OEM has, however, not agreed to transfer the technology for the same to IAF.

1.1.2 Flying tasks, payloads and other capabilities

As per policy page, the flying task fixed by Government/Ministry of Defence (MoD) is 66 hours per month per aircraft. The maximum and minimum payload of the aircraft is 6700 kg and 3000 kg respectively. The passenger carrying capacity of the aircraft is 40 to 50. The aircraft has a range of 1000 km and is capable of landing and taking off from semi-prepared advanced landing grounds.

1.1.3 Maintenance philosophy

The operating squadrons/wings are responsible for carrying out the first and second line servicing of the aircraft. Third and fourth line repair/ overhaul of airframes and aero engines are undertaken at Base Repair Depot 'X' (BRD 'X') and at Base Repair Depot 'Y' (BRD 'Y') respectively. The annual installed capacity for overhaul of airframes is 18 at BRD 'X'. No new facility for repair/overhaul of aero engines of Aircraft 'A' was created at BRD 'Y'. The facilities already existed at BRD 'Y' created for aero engines of Aircraft 'B' was utilised with some additions and modifications.

1.2 Scope of Audit

The performance audit in regard to Operation and Maintenance of Aircraft 'A' fleet in the Indian Air Force was conducted between June and October 2006 covering the period 2001-06. The performance audit focused on aspects of operation and utilisation of aircraft such as flying tasks, assigned role, serviceability and Aircraft on Ground (AOG). During the audit, adequacy of facilities for repair and maintenance and their use were also studied. Audit

examination of the records at all operational wings, squadrons, two BRDs and at Air HQ was carried out.

1.3 Audit Objectives

The aircraft operation and functioning of repair and maintenance facilities for airframes and aero engines were examined in audit to seek an assurance that:

- The operational squadrons of Aircraft 'A' functioned efficiently achieving their assigned tasks;
- The aircraft were used in an economic and efficient manner for bona fide role;
- The serviceability of aircraft was maintained as per laid down standards to minimize aircraft on ground;
- Facilities for aircraft repair and overhaul were timely set up and are adequate to meet the needs of the fleet;
- Servicing and maintenance of Aircraft 'A' was carried out efficiently, without delay, in a cost effective manner; and
- Internal control systems were effective.

1.4 Audit Criteria

- Authorised flying task; flying duties assigned; prescribed payload; authorised unit entitlement; and sanctioned establishment of operational staff.
- Adequacy and efficiency of repair and maintenance facilities.
- Scheduled timelines for setting up of facilities at BRDs; requirement of facilities as projected in project report and repair/overhauling capacity of BRDs in comparison to requirement.
- Provision of manuals and directives with regard to first and second line maintenance; targets set for overhauling tasks; achievement of TBO life; savings anticipated in cost; procedure prescribed for provisioning and procurement of spare and cost and quantity of spares procured locally subsequent to indigenization.

1.5 Audit Methodology

An entry conference was held at Air HQ on 14 June 2006 wherein the scope and objectives of audit and the broad compass of fieldwork planned were discussed with the representatives of the auditee organisation. Subsequent audit examination consisted of examination of documents and records at

Air HQ, concerned wings and squadrons and at the BRDs; collection of information through issue of audit memos and questionnaires; interaction with key personnel at Air HQ, Operation and Maintenance units and examination of material collected in past audits.

While all squadrons/units were audited, focus was placed on two squadrons holding 24 aircraft for examination of aircraft use and working of first and second line maintenance. Since overhauls of both airframes and engines carried out indigenously were limited during the period, all such overhauls were examined. Besides 25 *per cent* of other repair tasks were examined at both the BRDs.

An exit conference was held on 6th December 2006 at Air HQ wherein the main findings of audit and related recommendations were discussed.

1.6 Audit Findings

The audit findings are in two broad categories – (a) Operation and utilization of aircraft (b) Repair and Maintenance facilities.

1.6.1 Operation and utilization of aircraft.

Aircraft 'A' are being used by IAF for transport of troops and cargo, para-trooping, supply dropping, casualty evacuation, training and VIP duties. Audit examination focused on:

- achievement of prescribed norms for aircraft serviceability and targets specified for flying tasks;
- efficiency of utilisation of aircraft in terms of payloads;
- levels of AOG were also studied as these have a critical bearing on aircraft serviceability and also reflect on the adequacy and efficiency of support and maintenance facilities;
- utilisation of aircraft for bona fide roles;
- deployment of operational manpower in various squadrons.

The main findings that emerged from audit examination have been discussed in the succeeding paragraphs.

1.6.1.1 Utilisation rates, serviceability and AOG levels

The efficiency of operation and utilization of the Aircraft 'A' fleet was low due to high rate of AOG, low serviceability and less achievement in flying tasks. The year-wise position with regard to serviceability, AOG and flying task achievement of Aircraft 'A' for 2002-2005 is given in the table below:

Year	Percentage of serviceability		State of AOG percentage	Flying task *(Hours per month per aircraft)*		
	Achieved	Short fall		Authorised	Achieved	Percentage achieved
2002*	50.98	32.06	23.94	66.66	20.06	30.09
2003	49.46	34.06	29.96	66.66	33.86	50.79
2004	48.77	34.98	32.26	66.66	30.04	45.06
2005	46.94	37.42	33.29	66.66	33.04	49.56

* For the year 2002, data in respect of flying hours was available for last quarter only. Air HQ stated in June 2006 that during the year 2002 most of the hours had been exhausted in flying for Operation Parakaram.

Against the serviceability level of 75 *per cent* assumed by the Ministry at the time of procurement, actual serviceability rates of aircraft ranged between 47 and 51 *per cent* during last four years. The number of AOG was also high and increased from 23.94 *per cent* in 2002 to 33.29 *per cent* in 2005. This indicated that the required number of aircraft were not in ready to fly condition affecting their availability to the squadrons for use in assigned tasks. The high levels of un-serviceability and AOG of aircraft also indicate the existence of inadequate repair and maintenance capabilities at wings and repair depots.

Actual flying tasks performed using Aircraft 'A', therefore, fell significantly short of the flying task norm of 66.66 hours per month per aircraft prescribed by the Government. The shortfall ranged from 49.21 to 54.94 *per cent* during the period 2003-05. Air HQ stated in June 2006 that during 2002-05 the rate of flying tasks achieved was more than the rate of 30 hours per month per aircraft prescribed by it in 1995. Air HQ further stated that it had lowered the flying task in 1995 to conserve life of engines and airframes and on account of lower availability of serviceable aircraft and pilots. The reply highlights that this reduction in authorized flying task was done without the approval of the Government and flying tasks had to be reduced due to constraints on account of aircraft availability and shortage of pilots.

1.6.1.2 Underutilisation of payload capacity

The maximum payload capacity of the Aircraft 'A' is 6700 kg. The payloads carried in the sorties undertaken during the period 2001-2006 are analysed in the table below.

Year	Total sorties	Percentage of sorties as compared to total sorties				
		Less than 1000Kg.	Between 1000 Kg. to 2000 Kg.	Between 2000 Kg. to 3000 Kg	Between 3000 Kg to 4500 Kg.	More than 4500Kg.
2001-02	10664	37.30	12.59	15.66	30.71	3.74
2002-03	12600	28.42	13.11	20.30	34.91	3.26
2003-04	12192	29.72	12.10	20.19	35.10	2.89
2004-05	12766	29.29	15.23	20.12	31.54	3.82
2005-06	12680	33.69	14.11	17.66	31.05	3.47

It would be seen that the percentage of sorties in which payloads carried were less than the 3000 kg (less than 50 *per cent* of the maximum capacity) ranged between 61.83 *per cent* and 65.64 *per cent*. As such not only were the Aircraft underutilised in terms of flying hours, these were also underutilised in terms of payloads carried. Thus, high capacity aircraft were used for carrying low loads although smaller aircrafts and other modes of transport were available at lower cost. The utilisation of these aircraft was not made in a cost effective manner.

1.6.1.3 Deployment of aircraft in various roles

In 1995, Air HQ fixed flying tasks for each existing squadron/unit and also prescribed flying hours for each role assigned to the aircraft. Audit observed that Air HQ had fixed flying tasks for each unit that was far below the task fixed by the Government for Aircraft 'A'. Besides, Air HQ allocated flying tasks into three categories i.e Routine Transport Role (RTR), Air Maintenance and training. Air Maintenance tasks cover the designated primary role of the aircraft viz., troops and cargo carrier and also includes para trooping training.

Detailed analysis of flying tasks allotted for various roles and actual achievement by six squadrons/units test checked is given in the table below:

(in flying hours)

Role	Task allotted by Government	Task allotted by Air HQ	Task actually achieved with reference to flying hours fixed by Government		Percentage Shortfall in task achievement with reference to Air HQ targets
			Flying Hours	Percentage of total achievement	(+) excess/(-) shortfall
RTR	97440	41400	47583	48.83	(+)14.93
AM	78960	33600	19150	24.25	(-) 43.01
Training	79600	43800	18382	23.09	(-)58.04
Misc.	NIL	NIL	29398	All excess	All excess
Total	256000	118800	114513	44.73	(-) 3.61

While there was an overall shortfall of 55 *per cent* in achievement of flying task, targets fixed by the Government, the shortfall against targets fixed by Air HQ was only 4 *per cent*. Audit, however, observed that the aircraft were used for routine and miscellaneous tasks by diverting them from their primary roles of air maintenance and training. Of the total 114513 flying hours utilized, only 33 *per cent* were used for primary role of air maintenance and training, and the balance 67 *per cent* were spent for routine tasks and miscellaneous duties. This resulted in serious shortfall of 43 *per cent* in achieving air maintenance task and 58 *per cent* in training with reference to the reduced targets fixed by Air HQ. Audit noted that 25 *per cent* of total flying hours utilized were spent on miscellaneous duties though no task for such duties were allocated either by the Ministry or by the Air HQ

Air HQ stated (December 2006) that "miscellaneous tasks" are fully authorised and essential for maintaining operational readiness of the squadron. The reply of Air HQ is not acceptable, as the orders issued in 1995 have never been revised creating this category and authorizing flying hours under it. Further, the nature of tasks stated to be included in this category does not justify such a high utilization.

Regarding training, Air HQ stated that exclusive continuous training sorties are launched only when necessary. The training requirements of the unit are thus always achieved by combining training with other tasks, which leads to savings in operational expenditure. This reply is not acceptable as in the case

of operational squadrons flying hours allocated for continuous training have been kept at very low levels. Besides, training in course of normal flying limits the effectiveness of such training and also compromises flight safety.

Audit at squadrons showed that the annual flying tasks are not being prepared in advance based on any assessment of load and projections of tasks. Instead sorties and flights are planned on the basis of messages/signals received from Air HQ and Commands which are sent only a few days in advance. Thus, aircraft utilisation is not a planned exercise but is mostly requisition driven and not amenable to control and monitoring with reference to approved flying tasks for various roles.

1.6.1.4 Shortfall in undertaking training tasks at training centres

Para-trooping School

One of the primary tasks of the Aircraft 'A' fleet is para trooping. To achieve this task, a Paratroopers Training School (PTS) was set up with 12 aircraft. The school is required to operate a combination of two types of courses i.e. one type deploying six aircraft for para-trooping and medical PCB[2] training (Flight 'A'), and another type using the balance six aircraft for conducting conversion course (Flight 'B').

Audit examination also showed that even though the primary task of the PTS was training, 53 *per cent* of flying tasks were allotted for RTR with allocation for paratrooping being only 18 *per cent*. Even this low allocation for paratrooping training was utilised only to the extent of 51-67 *per cent* during the past five years.

Audit examination also disclosed that except for basic para trooping course, there was shortfall with respect to annual targets in each year for all other Flight "A" courses. Besides, the school was required to conduct Medical PCB and refresher courses and aircrew para ground training courses on an "as required" basis. However, during the period no such courses were conducted. In the case of Flight "B" courses, for which six aircraft were earmarked, it was seen that none of the envisaged courses i.e FA Controller Courses, Air Crew Paratrooping Courses and Air Crew Conversion Courses were conducted in the last five years. The facilities and aircraft earmarked for Flight "B" courses remained totally unutilised.

[2] PCB- Para Course Basic

Details of paratrooping training courses and conversion courses envisaged and actually held, actual output and shortfall against envisaged output during the period 2001-06 are given in Annexure I .

PTS stated that the shortfalls were on account of the Army not detailing troops for paratrooping courses and non-allotment of tasks by Air HQ for the other types of courses. Air HQ has informed that medical courses were disbanded in 1999.

Paratrooping and casualty evacuation are among the primary tasks assigned to Aircraft 'A' for which a specialized school was set up with 12 aircraft. The underutilization of these specialized facilities, created to equip armed forces with critical capabilities, indicates inadequate attention in an important area.

Training Centre at an Air Force Station

This training facility was created for training pilots on Aircraft 'A' with a UE of eight aircraft. The unit held one excess aircraft during 2001-02 and two during 2002-06 attributing the excess to additional training and other unspecified commitments. Details of flying task, allotted by Air HQ, and achievements against the same showed that against the allotted task of 5400 hours for training, achievement ranged between 2109 hours and 3459 hours showing a utilization rate which ranged from 39 *per cent* to 64 *per cent*. The unit also used aircraft for "miscellaneous and other tasks" for 1643 hours to 2174 hours, which was not authorized. Simultaneously, audit also observed shortfalls ranging from 20 to 82 *per cent* in training of pilots which is illustrated in the table given below:

Year	Output per year as per policy page (Number of pilots)	Actual output per year (Number of pilots)	Percentage of shortfall
2001	44	17	61.37
2002	44	21	52.28
2003	44	27	38.64
2004	44	08	81.82
2005	44	35	20.46
Total	**220**	**108**	

In the context of the shortfalls in achieving targets for training of pilots, underutilization of aircraft on core training tasks was not justified.

1.6.1.5 Modification and utilization of Aircraft 'A' for VIP use

Air HQ modified six Aircraft 'A' during 2001-03 for VIP use. It had earlier modified two aircraft for VIP use between 1992-99. The modification and utilization of eight aircraft was not only irregular but also lacked justification on account of the following:

- IAF did not have adequate number of serviceable Aircraft 'A' for its primary role of air maintenance, as a result the flying tasks assigned had to be reduced considerably as discussed in paragraphs 1.6.1.1 of this report. Therefore, diversion of such large number of aircraft (20 *per cent* of the total serviceable aircraft with IAF) for VIP use showed an unexpected indifference to its primary role.

- The modification involved change in the role of the aircraft from what had been approved by the Government. Hence the modification required approval of the Government. In December 1995, however, approval for modification of Aircraft 'A' was denied by the Government. Despite this, the IAF continued modifying aircraft and altered their role irregularly.

- A specialized Communications Squadron consisting of two Boeings, four executive jets, seven Avros and six helicopters, exists for use by VIPs. Government orders issued in 1981 regulate use of these aircraft by VIPs i.e. the President, the Vice President and the Prime Minister who are the only personages ordinarily entitled to use the aircraft in this squadron. Other entitled personages (OEP) including senior service officers can use aircraft of the Communications Squadron if it is essential to do so and aircraft are available. Given the existence of a specialized and dedicated squadron with adequate number of aircraft for flying VIPs and OEPs, diverting eight Aircraft 'A' for VIP/OEP use was not justified.

- During 1999-2004, the Avro fleet in the Communications Squadron was used only to the extent of 3.9 *per cent* by the three entitled personages and 46.9 *per cent* by OEPs. It was thus evident that existing aircraft in the specialized Communications Squadron were underutilized. This further diluted the justification for modifying Aircraft 'A' for VIP/OEP use.

- Besides, if there was unfulfilled demand for aircraft for VIP/OEP use, increase in the holding of the existing Communications Squadron should have been considered instead of designating Aircraft 'A' for

this purpose outside of the Communications Squadron. Earmarking aircraft for VIP role outside the Communications Squadron also led to dilution of control on use of service aircraft by VIPs and OEPs.

Audit scrutiny also disclosed that:

- The modified aircraft were not used by any of the three VIPs and were instead predominantly utilised by OEPs such as senior officers of the Services, AFWA/AWWA Presidents and their accompanying staff. AFWA/AWWA Presidents are not even covered under the category of OEPs. Expenditure on use of these aircraft by OEPs amounted to Rs.75 crore since their modification.

- Further, after modification, the payload and the passenger carrying capacity of the modified aircraft was significantly reduced to 1800 kg and 19 persons respectively. Test check of use of a modified aircraft during one year showed that it carried an average of three passengers and 2kg payload per sortie as against the passenger carrying capacity of 40-50 persons and load carrying capacity of 6700 kg of the aircraft.

The modification of eight aircraft for VIP role was thus both irregular and improper as it was a deviation from the aircraft's assigned role that had been fixed by the Government. Further, assigning VIP role to additional aircraft was improper as a specialized Communications Squadron with adequate number of aircraft already existed for this purpose, and the operational squadrons of IAF were facing serious shortage of serviceable Aircraft 'A'.

1.6.1.6 Deployment of operational personnel

Details of surplus/ deficiency in operational manpower in eight operational units/squadron of Aircraft 'A' during the period 2001-06 were as under:

Year	Percentage of surplus/ deficiency		
	Pilot	**Navigator**	**Flight Engineer**
2001-02	-22	+13	+10
2002-03	-19	+1	+14
2003-04	-18	+13	+25
2004-05	-14	+5	+27
2005-06	-13	+28	+34

The Aircraft 'A' squadrons/units had serious shortages of Pilots but surplus of Flight Navigators and Flight Engineers. The deficiency in the number of Pilots, however, declined from 22 *per cent* in 2001-02 to 13 *per cent* in 2005-06. In the case of Flight Engineers, the surplus manpower increased substantially from 10 *per cent* in 2001-02 to 34 *per cent* in 2005-06. Deficiency in pilot strength would have adverse impact on the rate of utilization of the aircraft. In fact, Air HQ, while justifying lowering the flying task from 66.66 hours to 30 hours per month in 1995, attributed this, inter-alia, to shortage of pilots. Further, deficiencies in pilot strength along with surplus in the strength of navigators and engineers indicates imbalance in deployment of operational manpower in these squadrons/units.

Audit examination further disclosed that two squadron/unit held surplus pilots over authorisation, six other squadrons/units faced deficiencies. Air HQ stated that additional manpower was being provided in the units entrusted with Air Maintenance role. This is not acceptable as it was seen that significant shortages of pilots existed in three squadrons and in PTS which had critical Air Maintenance and paratrooping training role.

Air HQ also justified excess manning in the two units on account of increase in task. Audit scrutiny, however, disclosed that the tasks achieved in these two units, have not shown any significant variation. No explanation has been provided by Air HQ for holding surplus Navigators and Flight Engineers in most of the units especially in view of significant shortages of Pilots in some of the units.

1.6.1.7 Deficiencies in records maintained for transport of passengers and cargo

A scrutiny of flight records held by two squadrons pertaining to six different months during the period 2004-06 disclosed the following inadequacies:

- A manifest of a flight provides details of passengers/cargo carried in the aircraft. Proper accounting of the manifests is essential to ensure that no unauthorised passenger/cargo is carried in the service aircraft. Audit observed that the manifests of Aircraft 'A' did not carry any serial or control number to ensure proper identification and accounting of the manifests. Manifests were also not entered into any control register by squadrons/unit providing airlift.

- Entries in the passenger manifests were altered without authorisation of the competent authorities. Further, operational requirement for airlifts and movement of cargo is often not brought out in the manifests.

- Unauthorised cargo such as personal belongings and other non-operational stores have been included in the manifests.

The inadequacies noticed disclose dilution of internal controls and increased risk of unauthorised use of aircraft.

Recommendations

- Air HQ should take effective steps to increase serviceability of aircraft and minimize AOG by ensuring timely repair and maintenance services combined with the availability of essential spares.

- Use of high capacity aircraft for carrying low loads would need review by IAF keeping in view the high operating cost of the aircraft and availability of other smaller transport and other modes of aircraft.

- Utilisation of aircraft requires comprehensive review so that strategies to enhance utilisation and bring these closer to the flying task fixed for the aircraft by the Government. Else, the Government should revise the flying tasks based on ground realities.

- Allocations of flying tasks should correspond closely to the primary roles of the aircraft especially in respect of air maintenance and training role of the units. Achievement of these tasks needs to be closely monitored.

- Diversion of aircraft from operational squadrons for VIP/OEP use may be discontinued to ensure increased availability of serviceable aircraft to the operational units/squadrons for air maintenance and other primary roles.

- Proactive steps should be taken to improve utilisation of the capabilities of paratrooping school in consultation with user agencies.

- Operational manning in units should be reviewed so that they are in consonance with tasks allocated to units.

- Improvements may be brought about in maintaining flight details and in recording and control of flight manifests.

1.6.2 Repairs and Maintenance

Aircraft are complex systems and their utilisation and serviceability is critically dependent on the timely availability of supporting repair and maintenance infrastructure and services. Aircraft 'A' have now been in service for a period of 15-19 years and the need for effective repair and maintenance is now greater so that operational advantages do not get reduced with the age of the aircraft. It is in this background that audit examined the availability of repair and maintenance facilities and their utilisation. Audit also studied repair and maintenance activities, including procurement and indigenisation, to assess if these were efficient and promoted economy. Findings in this regard have been discussed in the succeeding paragraphs.

Adequacy of repair and maintenance facilities

1.6.2.1 Delays and inadequacies in creation of facilities for overhaul and repair of airframes at BRD 'X'

The Aircraft 'A' were inducted by IAF during 1984 -1991 and therefore, facilities for overhaul and repair of airframes should have been set up by 1990 to carry out first major overhaul due in that year. The facilities were, however, established substantially only in 2002 i.e. after a delay of 12 years. The delays in setting up of these facilities and the resultant requirement of sending airframes abroad for overhaul at a cost of Rs.69.56 crore were reported earlier in Paragraph No.3 of Audit Report No.8 of 1998.

Further audit examination showed that items supplied by the OEM for creating the repair and overhaul facilities consisted of 116 test rigs used for testing of aggregates during overhaul of airframes. Out of 116 test rigs procured between 1995-2000, 11 test rigs were yet to be installed as of October 2006 due to defects and deficiencies.

Audit further observed that as a consequence of the delay in setting up complete overhaul capabilities and non availability of essential spares, 32 overhauls undertaken at BRD 'X' between 2002 to 2006 were cleared by Air HQ with a number of 'deficiencies/concessions'. These concessions were on account of non-replacement of mandatory spares and deviations from provisions of bulletins relating to modifications and non-testing for leaks in fuel tanks till next overhaul. This was a deviation from the requirement as rules permit clearing aircraft with concession for only three months followed by a review.

Further, Main Landing Gear (MLG) and Nose Landing Gear (NLG) are critical airframe aggregates. However, in-house capability for undertaking overhaul of MLGs remained limited due to non-availability of some equipment. As a result, overhaul of MLGs were being cleared with deviations. In the case of NLGs, BRD 'X' stated that it had set up necessary facilities for overhaul by June 2003 using available resources. However, it continued to rely on other BRDs and HAL for certain critical tasks. Due to delayed and incomplete establishment of overhaul facilities and shortage of non-mandatory spares, overhaul of 20 NLG had to be entrusted to the OEM in April 2005 at a total cost of USD 252000 (Rs. 1.12 crore).

1.6.2.2 Delay in setting up repair and overhaul facilities for Turbo Generators

Turbo generators are used for running of air conditioners in the aircraft. Repair facilities for TG-16M Turbo Generator fitted on Aircraft 'A' were set up at BRD 'Y' in 1995-96. Based on a feasibility study conducted by Hindustan Aeronautics Limited (HAL), Koraput Division, Government sanctioned the project in January 2001 for establishing overhaul facility for these generators at a total cost of Rs.10.42 crore with a probable date of completion of July 2003. Following Government sanction for creation of overhaul facilities at HAL, the existing repair facility at BRD 'Y' was dismantled and drawings/spares etc. were handed over to HAL in 2001-02.

Audit examination disclosed that the overhaul facility, scheduled to be set up by July 2003 was yet to be established as of August 2006 even though alternative repair facilities were not available in the country. Further, only Rs.2.42 crore out of the Rs.10.42 crore sanctioned had been spent by HAL upto December 2005 indicating only 25 *per cent* progress of work in setting up the repair and overhaul facilities. Air HQ failed to monitor the creation of facilities and called for reasons for delay from HAL only in August 2006. Air HQ stated in August 2006 that the expected date of establishment of overhaul facilities at HAL was September 2006 but these were yet to be established as of October 2006.

Due to delay in setting up overhaul facilities, IAF got 57 TG-16M generators overhauled abroad at a total cost of USD1862190 (i.e. Rs. 8.38 crore) under two contracts signed in September 2004 and November 2005. Besides, a contract for overhaul of 62 numbers of GS-24A generators (an aggregate of TG-16M generator) was signed in July 2004 at a total cost of USD188145 (i.e.Rs.0.85 crore). Had the indigenous overhaul facility been set up in time i.e. by July 2003, the generators along with their aggregates could have been overhauled at a cost of Rs.11.25 lakh (after considering escalation over cost estimated in 1999) per generator. The additional cost due to offloading of

overhaul task worked out to be Rs.4.82 lakh per generator. This resulted in extra expenditure of Rs.2.75 crore on overhaul of 57 numbers of TG-16M generator. These generators would continue to be sent abroad for overhaul till the facilities are set up.

1.6.2.3 Delay in commissioning of Test Rig in BRD 'Y'

For testing of fuel control units (FCUs) of aero-engines of Aircraft 'A', a supply order was placed on HAL in September 1998 for manufacture and supply of the test rig at a cost of Rs. 1.2 crore. The test rig was received in June 2001. However, the requisite work services for installation of the test rig were sanctioned only in December 2002. The work services were completed and the rig was commissioned in May 2005. As such, benefits from an investment of Rs.1.2 crore made in a critical facility could not be obtained for almost four years after the equipment was received which indicated inadequate project management.

1.6.2.4 Shortfall in manpower deployment at aero-engine facility at BRD 'Y'

There was a shortfall in the availability of manpower in the production line of aero engine of Aircraft 'A' since 2001-02 as shown in table given in Annexure II. The deficiency of airmen ranged from 66 to 90 during last five years constituting 45-53 *per cent* of the authorised strength. BRD 'Y' stated in August 2006 that the shortfall was met by working after normal hours and on holidays and that no extra manpower was diverted from other units. However, as the facility consistently failed to meet targets for overhauls and also failed to deliver products and services of acceptable standards, adverse fall out of manpower shortage on the capacity and capability of the depot to undertake core tasks cannot be ruled out.

1.6.2.5 Indigenisation of Aircraft 'A' spares

Indigenisation of spares is critical to reducing reliance on foreign suppliers for spares. As such, this was an important task to be undertaken in the context of Aircraft 'A' where problems were being faced in sourcing spares from the OEM/foreign suppliers. Audit examination in this regard revealed the following:

BRD 'X'

- Till March 2006, 3202 mandatory and Automatic Replenishment System (ARS) items of non complex design had been indigenised for which supply orders valued at Rs 11 crore for 335 lines of spares were

placed on various private firms. As of June 2006, of the orders placed, 197 lines of spares valued at Rs 3.62 crore ordered during 2003-06 were yet to be received.

- The task allotment for indigenisation of spares had progressively decreased. This was because initially only items of non-complex design were undertaken and thus these progressed on a fast track. During later years, as the remaining items were complex in nature, indigenisation exercises were need based.

BRD 'Y'

- Against the indigenisation target of 1900 spares during 2001-06, BRD indigenised 2011 spares. Full information on supply orders placed for indigenised spares was provided only for the years 2004-05 and 2005-06. It was seen that in 2004-05, 78 orders covering 86 items were placed of which 48 orders were yet to materialise. In 2005-06, 395 orders covering 436 items were placed of which 341 orders were yet to materialise.

It would thus be seen that whereas substantial progress was made in both the BRDs in indigenising mandatory spares, commercial exploitation had only met with limited success. Thus the overall effectiveness of indigenisation efforts was diluted.

Recommendations

- Project management and monitoring should be accorded priority so that repair and overhaul facilities needed to support aircraft serviceability are created timely and are designed to deliver full functionality.
- Constraints on capabilities of facilities to deliver full services should be addressed.
- Indigenisation of spares should be adequately supported with funds and resources and followed up with adequate commercial exploitation.

Efficiency and economy in repair and maintenance activities

1.6.2.6 Delay in second line servicing at operating units

The first and second line servicing of Aircraft 'A' is carried out in operating squadrons/units. The stipulated downtime for carrying out servicing at 300 hours is 13 working days and for servicing at the end of every 900 hours it is 22 working days. A total of 110 cases pertaining to three units comprising 89

cases pertaining to 300 hours servicing and 21 cases pertaining to 900 hours were examined in audit. It was seen that in 65 cases (59 *per cent*) the time taken for servicing exceeded the prescribed days as per details given in the table below:

Type of servicing	Extent of delay in days					Total no. of cases
	Within 24 hours	1 to 10 days	11 to 25 days	26 to 50 days	51 to 100 days	
300 Hours	NIL	17	23	04	01	45
900 Hours	NIL	07	11	02	02	20

It was explained in the exit conference that these delays were often caused due to non-availability of spares or detection of snags during servicing. However, in two units there were also shortages in maintenance personnel which could have also contributed to delay. These delays cause aircraft to become AOG.

1.6.2.7 Delay in meeting AOG demands

AOG demands for spares and rotables are required to be met within 24 hours so that incidents of AOG and their duration are minimised. However, a large number of aircraft remained AOG for inordinate periods on account of non-availability of spares and rotables as shown in the table below:

Year	Number of aircraft on AOG				
	1 to 6 months	6 to 12 months	12 to 18 months	18 to 24 months	More than 24 months
2001-02	39	7	-	-	-
2002-03	47	10	-	2	-
2003-04	30	11	-	-	1
2004-05	42	12	-	1	-
2005-06	26	17	3	-	-

Satisfaction levels with regard to AOG demands at operating units were analysed and the results are tabulated in the Annexure III. The analysis discloses that only 48 *per cent* of AOG demands could be met within 30 days whereas 34-46 *per cent* of the demands took one to six months to be met. This indicates deficiencies in provisioning and procurement of spares and rotables.

1.6.2.8 Shortfall in achievement of annual overhaul task and offloading of aero engines abroad for overhaul

BRD 'Y' had a capacity to undertake 30 overhauls each year. Yet it failed to achieve annual targets both for overhaul and repair tasks fixed during the period 1999-2005 as shown in the table below:

Year	Task allotted		Task achieved		Percentage of achievement	
	Overhaul	Repair	Overhaul	Repair	Overhaul	Repair
1999-00	45		10	36	100	
2000-01	30	30	12	16	40	53
2001-02	30	30	05	15	17	50
2002-03	30	30	08	26	27	87
2003-04	15	30	09	26	67	87
2004-05	27	26	20	18	74	69
2005-06	10	20	14	21	100	

In 2005-06, targets fixed were achieved largely due to the drastic reduction in the target for the tasks itself. Audit examination showed that failure to achieve tasks was on account of non-availability of spares due to incorrect assessment of requirement and delay in procurement as discussed below;

- Air HQ issued the forecast task for repair/overhaul of aero-engines of Aircraft 'A' for the production years 1999-2003 and 2000-2004 in August 1997 and in August 1998 respectively. BRD 'Y', however, finalized the requirement of spares for undertaking servicing and repairing of engines during 1999-2004 after a delay of more than two years i.e. between May and September 2000. This led to delay in initiating procurement action for required spares. Air HQ concluded contracts for procurement of 157 lines of spares in January 2002 of which 121 spares were received only in April/June 2003. The delay in supply of 115 lines of spares was due to inordinate delay in opening LOC and in deciding on the question of waiver of LD. Thus, spares required for the production year 1999-2004 were received 49 to 51 months after the start of task of production period 1999-2004.

- Due to the combined allotment of tasks upto 1999-2000 without fixing tasks separately for repairs and overhauls, the BRD undertook a disproportionately large number of repairs and few overhauls. As such estimates of requirement of spares for overhaul were understated and led to supplies that proved to be inadequate when tasks were separately fixed for overhauls and repairs. This further compounded the problem of shortage of spares.

- There was an accumulation of large number of Cat 'D' engines at BRD for repair and overhaul due to non-availability of spares as shown in the table below:

Year	Overhaul due	Capacity of BRD	Overhaul at BRD	Overhaul Abroad	Awaiting Overhaul
2000-01	17 98*	30	12	40 + =80	63
2001-02	48	30	05	40	66
2002-03	84	30	08	40	102
2003-04	19	30	09	40	72
2004-05	45	30	20	--	97
2005-06	45	30	14	43	85

- Carry forward Cat 'D' from previous year.

As a consequence of the failure of the BRD to meet overhaul targets as also to fully utilise available capacities, 120 engines had to be sent abroad between 2000 and 2002 for overhaul at an aggregate cost of US$ 14,160,000 (Rs.64.12 crore). Had timely action been taken to procure the required spares, 120 aero engines sent abroad could have been overhauled in India at a total cost of Rs.27 crore (cost computed based on average overhaul cost of Rs.2 2.36 lakh per aero-engine at BRD 'Y' during 2000-01 to 2002-03) with a possible saving of Rs.37 crore. Further, indigenous production and maintenance facilities also remained under-utilised during the period.

Shortfalls in achievement of overhaul tasks owing to non-supply of spares by the OEM and consequent offloading of overhauls tasks to the OEM was highlighted in paragraph 3 of Audit Report 8 of 1998. Even after a lapse of seven years such shortfalls in execution of overhaul tasks persist.

1.6.2.9 Premature withdrawal of indigenously overhauled engine

During the period 2001-2006, BRD 'Y' overhauled 56 aero engines. Of these, 13 engines were withdrawn prematurely within 500 hours. Out of the 13 engines, seven were prematurely withdrawn due to major defects. An expenditure of Rs.58 lakh had to be additionally incurred on the repair of twelve of the 13 aero engines withdrawn prematurely. One aero engine withdrawn prematurely was still under repairs (October 2006). The failure

rate of 25 *per cent* with regard to overhaul is indicative of deficiencies in the quality and standard of overhaul task carried out by BRD.

1.6.2.10 Premature withdrawal of aero engines before completion of TBO

TBO of the aero engine is 2000 hours. 70 aero engines consisting engines overhauled both by BRD and the OEM were withdrawn during 2001-06 even before TBO of 2000 hours was completed. While 34 engines overhauled at BRD were withdrawn prior to completing TBO, 36 engines overhauled abroad were similarly withdrawn. Considering that the OEM had overhauled almost four times more number of engines than BRD this indicated inadequacies in overhauls being conducted in the BRD.

1.6.2.11 Delays in overhaul (third and fourth line serving) of aero-engines at BRD 'Y'

The average lead-time for overhaul of an aero engine at BRD is six months. Time allowed under contracts with the OEM for overhaul of aero-engines also ranges between six to eight months. Analysis of overhaul records for 56 engines overhauled at the BRD during 2001-06 disclosed that only one engine was overhauled within six months and in case of the other 55 engines time taken for overhauls was far in excess of the average lead-time of six months. Details of delays in case of these engines are given in the table below:

Period taken for overhaul	Between 6 to 12 months	Between 12 to 24 months	Between 25 to 36 months	Between 37 to 48 months	More than 48 months
No. of aero engines	3	17	12	12	11

In the case of repairs of engines undertaken during 2001-06, delays were observed in 23 out of a total of 106 cases of repairs. In 13 of the 23 cases delays were for a period exceeding one year.

Thus not only were there shortfalls in carrying out overhauls and repairs with respect to allotted tasks, these were carried out with delays indicating inefficiencies in overhaul and repair carried out by the BRDs.

1.6.2.12 Delays in undertaking repair /overhauls of airframe and aggregates at BRD 'X'

The annual installed capacity for overhaul of airframe is 18 and prescribed turn around time for overhaul of an airframe is six months. Analysis of

overhaul records maintained at BRD reveals that time taken for overhaul in 39 out of 42 overhauls done during 2001-06 was in excess of the lead time of six months. The extent of delay is given in the table below:

Period taken for overhaul	Excess time taken for overhaul of airframes		
	Upto 2 months	2 to 4 months	4 to 6 months
	12	18	9

Due to low level of arisings (6 to 10 airframes), tasks entrusted to BRD 'X' were much less than the installed capacity of the Depot. Yet overhaul tasks were delayed indicating lack of efficiency in undertaking these tasks. Excess time taken resulted in non-availability of the aircraft for operations.

Time taken for completing repair and overhauls of aggregates/rotables was examined in a sample of 10 *per cent* of cases during 2002-06. Delays were computed with reference to six months prescribed for conducting these tasks. It was seen that delays were observed in around 10 *per cent* cases in 2003-04 , 15 *per cent* cases in 2004-05 and 20 *per cent* cases in 2005-06.

1.6.2.13 Delay in receipt of spares due to lack of proper monitoring of procurement

Air HQ concluded a contract for supply of spares with a foreign firm in January 2002 at a cost of USD 368049. This was based on a "most critical maintenance/production hold up" requirement projected by BRD 'Y' for the year 2001-02. These items were supplied in two lots in August 2002 and November 2002. Payment was released to the supplier against shipping and other documents in terms of the contract. Though documents showed that the first lot of spares consisting of 19 lines contained in nine cases, only one case consisting of 14 lines was received and the remaining eight cases containing five lines valued at USD 329343(Rs 1.61 crore) were not received. Non-receipt of these items, however, came to the notice of Air HQ only in August 2003 i.e. after one year. Air HQ took up the matter with the firm which accepted the discrepancy and despatched the balance spares in January 2004. Out of the five lines not supplied, two lines were required for replacement of blades in 10 Aircraft kept dismantled at BRD since 2001-02. As such, spares due for supply to the BRD in April 2001, were received only in December 2003 thereby delaying critical overhaul tasks. This reflects poor management of procurement and inadequate monitoring of purchases by Air Force authorities and Ministry of Defence even in cases of spares identified as "most critical" by user units. The long period of one year taken to detect short

supply is indication of failure of internal controls and holds considerable risk of fraud and misappropriation of Government money.

1.6.2.14 Excess utilization of man hours on repair and overhaul of aero engine

The time taken by BRD 'Y' in overhaul and repair of aero engines was substantially higher than the prescribed norms. For overhaul of a single aero engine, the standard man-hours prescribed is 6050 hours per engine. BRD 'Y', however, took 8423 hours per engine for overhaul of 51 aero engines during the period 2002-06. Similarly, 1400 hours are prescribed as standard man-hours for repair of a single aero engine of Aircraft 'A'. BRD took 165378 hours for repair of 93 aero engines during the period 2002-06 at the rate of 1778 hours per engine.

BRD informed that extra man hours had become necessary due to ageing of aircraft and non-availability of skilled manpower. Excess utilization of man-hours, besides indicating lack of efficiency also added to the cost of overhauls and repairs.

1.6.2.15 Extra expenditure on overhaul of aero engines

A contract for overhaul of 80 aero engines was concluded with a foreign firm in June 2000. In terms of clause 4.3 of the contract, the firm was required to inform IAF before replacement of any unserviceable aggregates with new ones during overhaul. The firm without adhering to the terms, replaced components in 58 engines for which it claimed payment of US $ 367766 (Rs 1.70 crores) from IAF in September 2001. The firm in support of its claim stated that the accessories replaced were found to be irreparable because previous overhauls of these engines in India had violated technological norms.

Another 40 aero engines were sent abroad for overhaul through an addendum of January 2002 to the aforesaid contract. Certain major items in case of four of the engines though not due for replacement were replaced by the firm during the overhaul. This was on account of the fact that the actual life of these items was not endorsed by the BRD 'Y' in the respective engine logbooks. The foreign firm claimed an extra amount of US $ 270795 (Rs 1.32 crore) on account of these replacements.

The above cases reveal inadequacies in overhauls conducted by BRD 'Y', deficiencies in enforcing contractual conditions and inadequate record maintenance, which caused additional expenditure of Rs.3.02 crore.

1.6.2.16 Loss due to failure to avail of warranty

Hydraulic Pumps are used in aircraft to create pressure for operating various services that use hydraulic systems such as landing gears, ramps, doors and cabin pressure. Eighty hydraulic pumps of 435 F make were contracted in April 2004 at a cost of US$432000 (Rs.1.91 crore) and were delivered by January 2005. Of these, 25 pumps failed within the warranty period of 12 months. However, claims under warranty were forwarded in time only in 14 cases. In eight cases, claims were not forwarded at all due to non availability of contract and supply details. Three other claims were not made in time. Thus, warranty claims in respect of eleven defective 435 F pumps were not raised in time resulting in a financial loss of USD 59400 due to deficiencies in maintenance of required purchase records.

1.6.2.17 Technology for extension of TTL of aero-engines

The service life of the aero engines was increased to 4000 hours in 1994-95 by acquiring relevant life extension technology from the OEM. However, the OEM did not provide technology (2002) for increasing TTL of aero engines from 4000 hours to 6000 hours. Considering that almost all aero-engines would have either exceeded a life of 4000 hours or would be very near doing so, IAF would be completely dependent on the OEM for overhaul of engines and extension of TTL to 6000 hours. In fact, the Ministry concluded two contracts with the OEM in September 2003 and March 2005, for overhaul of a total number of 83 aero engines abroad at a total cost of Rs. 48.67 crore. This was primarily on account of the fact that overhaul by the OEM had become inevitable, as they also needed life extensions, which only the OEM could provide. Overhaul and TTL extension tasks would henceforth need to be combined and aero engines will continue to be sent abroad for overhaul as the TBO and the life extension being given are for the same number of hours i.e 2000 hours. This would result in under utilisation of overhaul facilities existing at BRD 'Y'. In 2005-06, the overhaul tasks allotted to the BRD has already been scaled down to 10.

Audit examination showed that during technical discussions and price negotiations held in December 2002, the OEM had stated that it would positively consider the request of Air HQ to provide TTLE technology by the middle of 2003. However, no evidence was available to show that this was pursued further by IAF. Almost complete reliance on the OEM for engine overhauls on account of failure to obtain TTLE technology has encouraged the OEM to adopt rigid stand during price negotiations and has also increased the demand for changes, favourable to them, in contract terms and conditions. Very soon several engines would be reaching their extended life of 6000 hours and further life extensions would have to be considered.

Recommendations

- Bottlenecks on utilizing the capacity of repair and maintenance facilities arising out of shortage of spares should be addressed through careful and prompt provisioning and procurement.
- The quality of services and the level of efficiency in repair and maintenance facilities should be stepped up to eliminate delays, instances of premature withdrawals and use of man hours beyond norms.

1.6.3 Internal Control Mechanisms

One of the objectives of audit was to assess the efficacy of the system of internal controls underlying operations and maintenance of Aircraft 'A'. Findings in this regard are given below.

- Basic record keeping with regard to flights and sorties needed enhancement as scope for improvement existed in preparing and recording flight manifests. This has been discussed in para 1.6.1.7 of this report.
- While MIS and other reporting mechanisms were in place, there was no assurance, however, that these were being used to monitor and control operations and maintenance activities. On the operations side, it was seen that flying tasks were not being forecast and allotted in advance at periodic intervals and recourse to need based flying was being taken, followed by ex-post facto regularisation. Actual utilisation of aircraft has continued to deviate from tasks allotted by Air HQ in 1995 without any review or correction. The deviations have been detailed in para 1.6.1.3 and 1.6.1.5 of this report. On the maintenance side, failure to meet targets of engine overhaul, delays in completing overhaul tasks, delays in procuring spares have continued year after year without adequate remedial action.
- Both BRD 'X' and BRD 'Y' were holding old and non-moving inventory valued at over Rs.18 crore since 2001-02 and 2004-05 respectively. This, besides imposing avoidable inventory costs, reflects weakness in inventory control and management.
- Variations existed in the costing of overhaul of engines by BRD and Air HQ thereby indicating that no standard criteria for computing costs were in existence. This is evidenced by the cost of overhauls conveyed by Air HQ to MoD in 2004 as Rs. 72.30 lakh while processing of a

case of contracting overhauls abroad, whereas it conveyed to audit that the average cost of overhaul during the year 2004-05 was Rs.34.05 lakh.

1.7. Conclusion

The procurement of Aircraft 'A' was primarily for its METAC role which focuses on troop and cargo movement; para trooping and casualty evacuation. This report discloses that actual utilisation both in terms of flying hours and payloads carried were much lower than what was fixed by the Government. Deviations from the basic METAC role of the aircraft and the predominant use of the aircraft for routine transport assignments and "other tasks" at the expense of air maintenance role have also been highlighted. Of specific concern is the fact that training centres have been allocated substantial flying hours for routine transport role and these centres have logged considerable hours under this role and under "other tasks" while recording shortfalls with regard to their primary roles. As regards repair and maintenance, the necessity of toning up performance by repair and maintenance agencies and by provisioning and procurement agencies needs urgent attention. However, what is a matter of overriding concern is the growing reliance on the OEM for overhauls of aero-engines as technology for extending life beyond 4000 hrs has not been provided by the OEM. This, combined with the existing reliance on foreign firms for spares, poses a significant risk that would need to be addressed so that operational preparedness of Aircraft 'A' is maintained.

The matter was referred to Ministry in November 2006; their reply was awaited as of January 2007.

ANNEXURE I

(Refers to paragraph 1.6.1.4)

Details of Paratrooping training courses and conversion courses envisaged and actually held, actual output and shortfall against envisaged output

FLIGHT 'A'

Sl. No	Course	Output as per policy page	Actual output					Shortfall in percentage				
			01-02	02-03	03-04	04-05	05-06	01-02	02-03	03-04	04-05	05-06
1.	Basic	1250	1401	1342	1357	1447	1403	-	-	-	-	-
2.	Refresher	11700	8153	9124	10067	8275	9572	30	22	14	29	18
3.	Basic FF	100	100	77	-	01	13	23	100	100	99	87
4.	Refresher FF	800	63	80	48	14	29	92	90	94	98	96
5.	Path Finder	12	-	06	-	06	10	100	50	100	50	17
6.	Jump Master	72	-	24	-	44	55	100	67	100	39	24
7.	PJI Course	As required	10	09	08	07	07	Shortfall not known as output not specified in policy page				
8.	Medical PCB	As required	100 per cent shortfall due to non allotment of task by Air HQrs.									
9.	Medical PC Refresher	As required	100 per cent shortfall due to non allotment of task by Air HQrs.									
10.	Aircrew Para Ground Training Courses	As required	100 per cent shortfall due to non allotment of task by Air HQrs.									

Flight 'B'

Sl. No.	Course	Duration (Days)	No. of courses to be conducted in a year	Intake per course	Output as per policy page	Actual output
1.	FA Controller Airborne Course	On required basis	-	On required basis	-	NIL
2.	Aircrew paratrooping course					
A	Basic	28	12	08	96	NIL
B	Refresher	07	24	12	288	NIL
C	Jump Master	07	--	--	72	NIL
3.	Aircrew conversion course					
A	Captain conversion Course	120	03	10	30	NIL
B	Second pilots conversion course	120	03	08	24	NIL
C	Navy pilots conversion course	120	03	09	27	N9IL
D	Flight Engineer conversion course	120	03	09	27	NIL

ANNEXURE II

(Refers to paragraph 1.6.2.4)

Detail of availability of manpower in the production line of aero engine

Year	Authorised establishment		Posted strength		Deficiency	
	Officers	Airmen	Officer	Airmen	Officers	Airmen
2001-02	03	177	01	95	02	82
2002-03	03	170	01	94	02	76
2003-04	03	170	01	90	02	80
2004-05	03	147	01	81	02	66
2005-06	03	170	01	80	02	90

ANNEXURE III

(Refers to paragraph 1.6.2.7)
Satisfaction level with regard to AOG demands at operating units

		Demand satisfaction level				
Year	**Total No. of demand raised**	**Between 1-15 days**	**Between 16-30 days**	**Between 31-180 days**	**More than 180 days**	**Demand pending/ cancelled**
2001-02	2476	462(19%)	862(35%)	848(34)	143(6%)	161(6%)
2002-03	1880	306(16%)	541(29%)	871(46%)	142(8%)	20(1%)
2003-04	4612	996(22%)	1131(25%)	2018(44%)	350(7%)	117(2%)
2004-05	5359	1316(25%)	1387(26%)	2161(40%)	291(5%)	204 (4%)
2005-06	6238	1517(24%)	1491(24%)	2326(38%)	272(4%)	632(10%)

GLOSSARY

AFWWA	Air Force Wives Welfare Association
ARS	Automatic Replenishment System
AWWA	Army Wives Welfare Association
IAF	Indian Air Force
Km	Kilometer
LD	Liquidated damage
LOC	Letter of Credit
METAC	Medium Tactical Transport Aircraft
MIS	Management Information System
OEM	Original Equipment Manufacturer
TBO	Time Between Overhaul
TETTRA School	Technical Type Training School
TTL	Total Technical Life
TTLE	Total Technical Life Extension
VIP	Very Important Person

MINISTRY OF DEFENCE

INDIAN AIR FORCE

PROVISIONING AND PROCUREMENT ACTIVITIES AT HQ MAINTENANCE COMMAND, BASE REPAIR DEPOTS AND EQUIPMENT DEPOTS

CHAPTER II: Provisioning and procurement activities at HQ Maintenance Command, Base Repair Depots and Equipment Depots

Highlights

- The Government decision of 1995 to decentralise provisioning and procurement of stores from Air HQ to Maintenance Command and Depots has not been fully implemented even after 11 years of the decision. Allocations of resources to the Maintenance Command and Depots for procurement of transferred items were a meagre 4 *per cent* of the total budget allocations to IAF. Thus the procurement activities continue to be highly centralised in Air HQ.

  (Paragraph 2.1.1 & 2.6.1.1)

- Provisioning reviews conducted by HQMC for determining requirement of stores were considerably delayed. In 30 *per cent* of the cases test checked, the provisioning reviews did not commence timely. HQMC could not complete the review work within the prescribed time in 73 *per cent* of cases.

  (Paragraph 2.6.2.2)

- Procurement from Government agencies like ACASH was low. HQMC was also found to be not complying with the requirement of making purchases at rates and from sources fixed by DGS&D. HQMC procured items at rates higher than the DGS&D rate contracts resulting in avoidable extra expenditure of Rs.2.33 crore.

  (Paragraph 2.6.3.1(b) & (c))

- There was lack of competitiveness in the procurements made by HQMC as only 17 *per cent* of the procurements were based on open tenders and remaining purchases were either on limited or single tender basis.

  (Paragraph 2.6.3.3)

- **The vendor base in respect of clothing items was limited and there was only one vendor in respect of 20 items. Thus the procurement of these items by HQMC cannot be expected to be competitive.**

(Paragraph 2.6.3.6)

- **Irregular changes in specifications of clothing and general stores were made by Air Force without approval of Government. These changes in specifications had the impact of reducing competition in procurements by excluding government production agencies like Ordnance Factories and led to avoidable extra expenditure and delays in procurement.**

(Paragraph 2.6.3.7)

- **Units were resorting to excessive local purchase of clothing and MT stores though such purchases were allowed only to meet small and emergent requirements. Local purchase of MT stores were as high as 74 *per cent* during 2001-06. Local purchase of clothing items also increased significantly from 24 *per cent* to 57 *per cent* during this period, indicating failure of centralized system of procurement.**

(Paragraph 2.6.3.8)

- **Large number of AOG demands for spares of aircraft discloses weakness of provisioning function. The fact that, in the case of ten types of aircraft, only 0.36 *per cent* of the AOG demands could be cleared within the due time also shows that provisioning for AOG suffers from shortcomings.**

(Paragraph 2.6.4.1)

- **In Depot 'R' demand satisfaction, which was 100 *per cent* before transfer of responsibilities to HQMC slipped between 98 and 75 *per cent* in the post transfer period.**

(Paragraph 2.6.4.3)

➢ **Benefits from transfer of procurement responsibilities to HQMC and depots have largely been elusive due to limited and uncoordinated devolution.**

(Paragraph 2.6.6.1)

Summary of recommendations

- Processing of Provisioning Reviews (PRs) should be made efficient and time taken at various stages reduced so that administrative lead-time - which is under IAF's control- may be reduced.
- Changes in Maximum Potential Establishment (MPE) should be made with due approvals, after reduction in lead times are achieved and stabilized.
- Requirements for procurement through Government agencies should be complied with.
- Procurement should be transparent and based on greater competition so that IAF can derive benefits of cost reduction and timely supplies. This should be supported by a strong vendor development programme.
- Changes in specification should be a controlled activity and should be closely monitored.
- Implementation of Integrated Material Management On Line System (IMMOLS) should be rolled out at all sites. The changeover process should be carefully managed so that complete and accurate data is ported from manual registers and stand-alone applications. Reports necessary for top level management control should be generated and used for effective monitoring of key areas.
- Devolution of responsibilities should be in conformity with the overall philosophy behind initiating the transfer. As such a clear road map for transfer of responsibilities with definite time frames and activity schedules should be drawn up and implemented.
- The transfer effected till date should be comprehensively studied and evaluated so that weaknesses are identified and addressed.
- Full and appropriate support infrastructure should be made available to HQMC and the depots to allow them to exercise their enhanced responsibilities effectively.

2.1 Introduction

2.1.1 Provisioning and procurement together constitute the cornerstone of IAF's materials management system. Efficient materials management is critical to the IAF as it holds approximately 5.66 lakh items of different kinds for maintaining its complex and sophisticated systems. Earlier, all provisioning and procurement activities of stores were centrally undertaken by Air HQ but in September 1995, Government accorded sanction for transfer of provisioning/procurement activities of stores to Headquarter Maintenance Command (HQMC) and the Depots in a phased manner. Therefore, from April 1996 onwards provisioning and procurement of stores in IAF are being carried out at three different levels viz., Air HQ, HQMC and depots. The transfer of procurement activities is still not complete, and so far HQMC and Depots have been transferred responsibilities for procuring stores relating to spares of 19 weapon systems, clothing and MT stores from indigenous sources. HQMC and Depots procured stores worth Rs.361.92 crore during 2001-06 under their delegated powers.

Procurement is both the *raison de etre* and a consequence of the provisioning process, and is integral to the overall objective of ensuring availability of the right material in the right quantity in a cost effective manner. Procurement, in IAF, is done through a tendering process (open, limited or single) or from government agencies such as DGOEF, and ACASH.

2.2 Scope of Audit

Audit examined provisioning and procurement activities undertaken by HQMC, two Base Repair Depots (BRDs) and four Equipment Depots (EDs) during 2001-2006. Provisioning and procurement responsibilities were transferred to HQMC and depots in five phases from 1996 onwards. Audit coverage focused on clothing, MT stores and nine ranges of weapon systems, out of 21 ranges transferred so far.

2.3 Audit Objectives

Audit sought to examine whether:

- HQMC and Depots have been equipped adequately to undertake enhanced provisioning and procurement tasks.
- Provisioning activities are being undertaken efficiently and with due regard to regularity and economy.

- Procurement activities comply with the norms laid down in the Defence Procurement Procedures, and are transparent.
- Benefits envisaged on account of decentralization were achieved.
- Internal controls were effective to ensure timely and cost effective procurements under delegated powers.

2.4 Audit Criteria

The following audit criteria were used to evaluate the performance of the HQMC and depots in undertaking provisioning and procurement activities under the powers delegated to them:

- ✓ Prescribed periodicity for conducting provisioning reviews
- ✓ Prescribed lead time for undertaking and completing procurements after provisioning reviews
- ✓ Norms and procedure laid down by the Ministry/Air HQ for procurement of transferred items.
- ✓ Monitoring and control systems including quality control.
- ✓ Improvement in the percentage of AOG and serviceability
- ✓ Time frame fixed for transfer of functions
- ✓ Conditions laid down for transfer of functions
- ✓ Adequacy of supporting infrastructure at HQMC and Depots
- ✓ Advantages envisaged from transfer of functions

2.5 Audit Methodology

Entry conferences were held at Air HQ and HQMC on 4th July 2006 and 21st July 2006 respectively. During the conferences, the scope of audit, objectives, related sub-objectives and criteria were discussed with representatives of the auditee. Subsequent audit examination included examination of records relating to provisioning and procurement activities; collection of information through issue of audit memos and questionnaires and interaction with key personnel at Air HQ, HQMC, selected EDs and BRDs. Audit was done at Air HQ, HQMC, four Equipment Depots and two Repair Depots. Audit also analysed information extracted from databases in Air HQ and HQMC using computer assisted tools and drew conclusions which were selectively validated during audit fieldwork.

An exit conference was held at Air HQ on 27th December 2006 wherein main audit findings were discussed.

2.6 Audit Findings

2.6.1 Budget allocations, utilization and control

Budgeting is an important part of planning for procurement. It also serves as a monitoring mechanism for assessing performance in relation with planned task and exercise expenditure control.

2.6.1.1 The trends of expenditure against budget allocations in respect of Air HQ and HQMC for procurement of 21 ranges of stores during the period 2001-06 were as given in the table below:

(Rs. in crore)

Year	Total budget of Air Force	HQMC*			
		Allotment to HQMC	HQMC Allotment as a percentage of Budget allocation to Air HQ	Expenditure	Percentage utilization
01-02	2391.15	94.38	3.90	54.58	57.83
02-03	2452.43	84.29	3.40	63.40	75.22
03-04	2441.17	96.74	3.96	75.06	77.59
04-05	2884.55	87.25	3.02	47.16	54.04
05-06	3670.06	131.67	3.58	121.72	92.44
Total	13839.36	494.33	3.57	361.92	73.21

* HQMC figures include procurements made by depots also.

Audit analysis of the budget and expenditure trends disclosed that:

- Despite the Government decision of 1995 for transfer of procurement activities to HQMC and Depots, the procurement activities were highly centralised in Air HQ. The total allocations to HQMC for procurement of items under 21 ranges of transferred stores was less than four *per cent* of total revenue budget of IAF under the same heads indicating that 96 *per cent* of the budget allocations for procurement continued to remain with Air HQ. Thus, the pace of implementation of 1995 policy was very slow as only 21 range of items were transferred out of a total

of 43 range of stores procured by IAF. Even in the transferred ranges, the allocations were almost negligible. This position persists even a decade after the need of transferring these activities to HQMC and the depots was felt.

- Though the allocations made to HQMC were meagre, it was never able to utilise the allocated funds fully. Of the total budget allocations of Rs. 494.33 crore during 2001-06, it could spend only Rs.361.92 crore resulting in saving of 26.79 *per cent* of the allocation. According to HQMC, this was due to non-materialisation of indents and supply orders and consequent non-clearance of bills within the financial year. This reply is not acceptable as it should have properly planned and monitored the procurements especially when the amounts allocated were small.

2.6.1.2 Procurement and provisioning responsibilities have been devolved to Depots without making budget allocations to them (December 2006). Only since March 2005 HQMC has started obtaining quarterly returns from depots on value of stores ordered/received purportedly for the purposes of expenditure control. However, bills in respect of all the Depots continue to be sent to the JCDA of HQMC for payment as information on budget is not available with Depot level payment authorities. Such a system is fraught with risk of delay in making payments and also suffers from the lacunae of Depots not being able to exercise effective control over expenditure incurred by them on various procurements.

Similarly, HQMC and Depots place orders for procurements from HAL by issuing RMSOs. However, no budget allocations are made by Air HQ to HQMC and the Depots to cover these orders. Allocation and monitoring of expenditure in respect of such orders are done by Directorate of Financial Planning (Air HQ). Consequently, no effective expenditure control could be exercised at HQMC and Depot level before committing the expenditure.

Recommendations

- Adequate budget allocations should be made to HQMC and Depots to effectively implement the Government decision of 1995 for decentralizing procurement activities.

- HQMC and Depots should improve their budget formulation, procurement planning and contract monitoring to ensure that the allocated funds are utilized without substantial savings.

2.6.2 Provisioning Activities

Provisioning is key to procurement and to ensuring availability of appropriate stores and material at required levels. Provisioning is the process of comparing the holding of an item of equipment/material with the anticipated requirements during a specified period with a view to determine whether deficiency or surplus exists. The different types of provisioning reviews followed in IAF are (i) periodical reviews which are done as per laid down structure and cycle for assessing the requirement of stores; (ii) special reviews which are carried out on an "as required basis" to cater to the unforeseen situations normally arising out of "inabilities" to cater to Air craft on Ground (AOG) demands and Production Hold-ups (PHUs); and (iii) "Life of Type" reviews.

The review or estimation of requirement in the above manner is calculated based on consumption pattern, maximum potential establishment (MPE), expected level of usage and exploitation of assets and also scale of use and entitlement.

Audit examination of the provisioning process of HQMC and Depots disclosed unauthorised changes in provisioning levels, delays in conducting and approval of provisioning reviews etc., as discussed below:

2.6.2.1 Unauthorised change in the provisioning levels

The MPE or the provisioning levels for various items are fixed with the approval of Government and form the basis for determining future requirements of stores. The MPE for an item/equipment is fixed both in relation to the authorized level of holding at the depots and the procurement lead time. IAF Regulations (IAP 1541) lay down different levels of MPEs for different types of stores and the periodicity of review for these stores.

HQMC, without being competent to do so, carried out indiscriminate and frequent changes in the level of MPE and periodicity of review cycle of various items. It did not refer the proposals for change in MPE to Air HQ/Ministry despite being advised by Air HQ not to change MPE's without the approval of the Government. Thus, the action of HQMC was arbitrary and irregular.

Internal assessment made by HQMC itself disclosed that reduction in MPE with regard to clothing stores had led to stocks of 50 *per cent* items falling below the prescribed nine months requirement. There were also stock-outs in items like shoes black leather, summer uniform, durries small, sheet barrack and capes water proof due to reduction in authorized inventory level.

2.6.2.2 Delays in conducting Provisioning Reviews

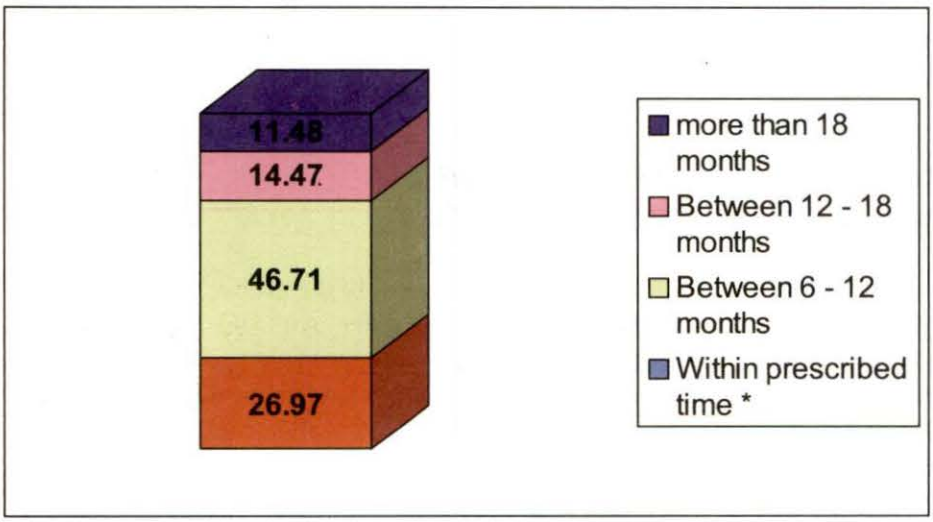
The prescribed administrative lead-time in respect of indigenous sources of supply is six months and that in respect of import origin is 12 months. Control over administrative lead-time is critical to provisioning. Delays on this account could lead to stocks falling below the prescribed minimum level and stock-outs. In all, about 195 Provisioning Reviews (PRs) are conducted every year by HQMC for various ranges of items. Audit selected a sample of 152 PRs relating to seven ranges of stores covering a period of three years (2003-06) to analyse the management of administrative lead-time at HQMC level. The Audit observed following deficiencies in the administrative lead-time management:

(i) In 30 *per cent* of the cases test checked, the provisioning reviews did not commence timely. The delays in commencement of PRs ranged between two months to fourteen months.

(ii) HQMC could complete the review work within the prescribed time only in 27 *per cent* of the cases and remaining 73 *per cent* cases the PRs were delayed for periods ranging from more than six months to 66 months. The analysis is presented in the graphical form below:

Delays in completion of Provisioning Reviews

(Figures in *per cent*)



Audit also observed inordinate time was taken in sending PRs to the IFA for concurrence. The time taken to send the cases to IFA ranged from 17 days to 627 days. In 47.37 *per cent* cases, IFA took more than one month to give concurrence.

Thus, there were significant delays in conducting provisioning reviews by HQMC indicating serious deficiency in procurement planning and monitoring systems.

2.6.2.3 Delays in contracting supply of imported stores

All cases of imported spares and cases beyond the financial purview of HQMC are sent to Air HQ for approval and contracting of supplies after carrying out technical vetting and provisioning review. Audit scrutiny revealed that there have been inordinate delays by Air HQ in clearing the PRs and contracting supplies, as depicted in the following table.

System	No. of cases examined	Time taken for contracting supplies of spares			
		Within prescribed period (7 months)	Between 8-12 months	1-2 years	Above 2 years
Aircraft 'A'	66	21	5	26	14
Aircraft 'B'	3	2	0	0	1
Aircraft 'C'	25	21	3	1	0
Aircraft 'D'	165	76	31	37	21
Aircraft 'E/F'	90	41	23	21	5
Aircraft 'G'	95	30	34	20	11
Total	**444**	**191**	**96**	**105**	**52**
Percentage	**100**	**43.02**	**21.62**	**23.65**	**11.71**

Thus, in 57 *per cent* of the cases test checked by the Audit, the supplies were not contracted within the prescribed time by Air HQ. Time taken for contracting supplies/spares was significantly higher in respect of Aircraft 'A', Aircraft 'D' and Aircraft 'G'. Such delays at Air HQ could have a negative impact on availability of spares at depots, thereby affecting their performance and increasing AOG.

2.6.2.4 Continuous raising of Special Reviews

Sound provisioning system considers past consumption, usage rate and future plan. In IAF, the stores are provisioned upto their authorised level. PRs are

carried out periodically to cover all items in a specified period. Ordinarily AOG, Production Hold-up and Most Critical Materials PRs should be an exception rather than a regular feature provided the periodical provisioning function is efficiently undertaken. The reviews raised for this purpose are termed as Special Reviews (SRs). However, audit found that one depot covering two systems raised 213 SRs between 2003-04 and 2005-06 towards AOG, PHU and MCM. Audit scrutiny of 191 SRs revealed that as of September 2006, contracts for 10 SRs only had been concluded. Further, considerable time was consumed at various stages of processing of Special Review requirements as shown in days below:

	SR to Indent			Indent to Contract			SR to contract		
Days	0-30	30 - 60	Above 60	0-30	30-120	Above 120	0-30	30-120	Above 120
No. of SRs	83	77	31	4	3	3	4	2	4

Raising of considerable number of Special Reviews indicates deficiency in the provisioning process at HQMC. These SRs were raised to meet AOG and production hold-up. Hence inability in converting the resultant indents into contracts in time defeats the very purpose of raising SRs.

Recommendations

- Processing of PRs should be made efficient and time taken at various stages reduced so that administrative lead-time is minimised.
- Changes in MPE should be made, with due approvals, after reduction in lead times are achieved and stabilized.
- Time limits for processing of SRs should be prescribed so that AOG and PHU requirements are met on urgent basis.

2.6.3 Procurement activities

A total of 258 supply orders were placed ex-trade by HQMC during 2001-06 for procurement of various types of stores. Of these, 52 *per cent* pertained to clothing items, 20 *per cent* for MT stores and balance 28 *per cent* related to spares for 19 weapon systems. Significant audit findings with regard to procurement activities undertaken by HQMC and the depots are given in the succeeding paragraphs.

2.6.3.1 Low procurement through Government Agencies

a) Ordnance Factories

Armed Forces are expected to place indents on the Director General of Ordnance Equipment Factories (DGOEF) at regular intervals to meet their requirements for clothing and general stores from five Ordnance Factories set up for this purpose. However, as indicated in the table below, of the total amount spent for procurement of all clothing items by HQMC during 2001-06, only 70 *per cent* pertained to orders on DGOEF.

(Rupees in crore)

Year	Total expenditure on clothing.	Expenditure on clothing supplies from DGOEF	DGOEF clothing supplies as a percentage of total clothing supplies
(1)	(2)	(3)	(4)
2001-02	32.42	20.59	63.50
2002-03	43.27	21.80	50.38
2003-04	61.85	31.58	51.05
2004-05	37.68	30.00	79.64
2005-06	99.03	88.34	89.20
Total	274.25	192.31	70.12

Only about 50 *per cent* supplies of clothing were obtained from DGOEF during 2002-04, however the position improved in the subsequent years and nearly 90 *per cent* of the supplies were obtained from Ordnance Factories in 2005-06. Despite existence of dedicated facilities under the DGOEF for production and supply of clothing and general stores, HQMC sourced high percentage of requirement of these items from trade during 2001-04.

b) Director General of Supplies and Disposal (DGS&D)

DGS&D concludes rate contracts for items that are common to all Government departments including the Armed Forces. Under the standing instructions of Government, when items conforming to the prescribed specifications are available on such rate contracts, those should be procured only from the firms enlisted in the DGS&D rate contract. Audit examination showed that HQMC is not complying with the aforesaid instructions and instead has been resorting to purchases from trade. Procurement from trade, besides being non-compliant also led to avoidable extra expenditure. Audit

found that while no orders for clothing items were placed against DGS&D rate contracts between 2001-02 and 2004-05, HQMC placed 13 supply orders on trade for 34 items which were on DGS&D rate contracts. Audit examination disclosed that HQMC procured these items at rates higher than the DGS&D contract rates resulting in avoidable extra expenditure of Rs.2.33 crore.

c) ACASH

As per Government orders, procurement of handloom items, blankets, durries etc. are to be made from the Association of Corporation and Apex Societies of Handloom (ACASH). However, between 1996-97 and 2002-03, HQMC placed 12 supply orders for these items of which only four were placed on ACASH. After 2002-03, no orders were placed on ACASH while four orders were placed on trade. HQMC attributed this to the inability of ACASH to supply stores as per the revised specifications of the Air Force. This indicates that changes in specifications made by Air Force are having the effect of completely excluding ACASH from its purchase purview.

2.6.3.2 Indirect import through HAL

Though HQMC and the Depots are authorized to procure only indigenous stores, they have also been placing orders on HAL for imported stores in the form of "bought-out items". This is contrary to the existing policy which stipulates that Air HQ alone is authorised to place order for imported items. This is also leading to imports getting erroneously classified as indigenous items. Test check by Audit disclosed procurement of 101items of imported stores worth Rs.4.06 crore by HQMC during 2004-06 through HAL are in violation of delegated powers.

2.6.3.3 Lack of competitiveness in HQMC procurements

General Financial Rules prescribed that procurements beyond Rs 2 lakh should be undertaken through open tenders. HQMC, however, resorted to limited tenders for most of its procurements. Limited tenders were also undertaken for high value and commonly available items, on the ground that the item was of unique specification. Audit noticed that out of 243 tender enquiries floated by HQMC during 2001-06, only 41 procurements (16.87 *per cent*) were based on open tenders. Of the remaining 202 tenders, 181 (74.49 *per cent*) were based on limited tenders and 21 (8.64 *per cent*) on single tenders.

The excessive reliance on limited tenders was also objected to by the IFA of HQMC on the grounds that it restricted competition and led to frequent delivery period extensions apart from 30 to 35 *per cent* increase in prices in

certain cases. The IFA also pointed out that reliance on limited tenders increased the risk of cartel formation.

Audit also observed that the single/proprietary tenders included commonly available items like Printed Circuit Board (PCB), stabilizer, Balancing Dynamo, Safe Iron, Nickel Cadmium cells and Net Mosquito. These were procured as purchases from OEMs thereby restricting the scope for development of multiple sources and minimizing cost by achieving greater competition in procurements.

2.6.3.4 Delays in processing of tenders

Orders of the Government prescribe a time schedule for conversion of indents into supply orders. The broad time prescribed for receipt of quotations after finalisation of PR is 14-18 weeks. The time prescribed for examination of quotations upto the stage of placement of orders ranges from 8-12 weeks. It has been stipulated that the total time to complete all activities should be generally between five to seven months. Test check by Audit in 116 procurement cases in HQMC and four Depots indicated that the tenders were not processed timely and there were significant delays. The actual time taken for issue of tender enquiries and finalization of contracts/supply orders by HQMC and four units against the prescribed time norms is given in the table below:

Unit	No. of Supply orders	Time taken for floating tender enquiries (in weeks)				Finalisation of supply orders after opening TE (in days)		Total time taken in months					
		Within 18	18-22	>22	Percent-age of delay	With in 90	>90	<5	5-7	7-12	12-24	>24	Percent-age of delay
HQMC	25	11	5	9	56.00	NA	NA	1	5	13	6	Nil	76.00
Depot 'P'	50	41	Nil	9	18.00	52	4	38	2	7	3	Nil	20.00
Depot "Q'	6	4	1	1	33.33	3	3	3	2	1	Nil	Nil	16.67
Depot 'R'	25	13	4	8	48.00	NA	NA	Nil	2	13	9	1	92.00
Depot 'S'	10	4	3	3	60.00	NA	NA	Nil	Nil	6	4	Nil	100
Total	**116**	**73**	**13**	**30**	**37.07**	**55**	**7**	**42**	**11**	**40**	**22**	**1**	**54.31**

Thus in 37 *per cent* cases, the tender enquiries were not floated in time after finalization of PRs, and the contract finalization was delayed in 54 *per cent* of the procurements made by HQMC and Depots. Efficiency of tender processing was low in HQMC, Depot 'R' and Depot 'S' as majority of procurements made by them were delayed significantly.

2.6.3.5 Delay in inspection and accounting of stores

Supply orders for clothing and general stores stipulate production of prototype samples within 60 days for approval. No time frame is, however, fixed for inspection of bulk supplies and release of inspection notes. Consequently such activities were consuming abnormally long time. Out of 21 supply orders issued by Depot 'R' during 2005-06, DQAS took 25 days to 165 days time for the clearance of samples itself. As regards inspection and issue of inspection note after clearance, DQAS took 40 to 332 days in respect of supplies against these orders.

There also existed delays in bringing the inspected stores into stock/account by the depots concerned. In the case of the 21 supply orders examined by audit, the Depot 'R' took less than thirty days in respect of 25 *per cent* cases for stock accounting; in respect of 60 *per cent* case they took 30 to 90 days; and the balance 15 *per cent* were taken into stock after more than 90 days.

Such long periods in carrying out inspection and taking supplies into stock were unjustified and may delay supply of stores to the indenting units.

2.6.3.6 Inadequate Vendor base for clothing items

All procuring agencies are expected to draw up and update vendor lists by suitably identifying sources of supply. The task of formulating detailed procedures for registration of firms/vendors is normally vested in Quality Assurance agencies. The list of registered vendors is required to be updated every six months and intimated to all central procurement agencies of Air Force. Although HQMC and Depot 'R' became the procurement agencies for clothing and general items since September 1995, responsibility for developing vendors did not devolve on them. Air HQ entrusted this responsibility to JD (QAS) at Air HQ. As per instructions issued by HQMC in September 2002, out of 106 items of clothing required by Air Force, 77 were to be procured from trade. Of this, JD (QAS) could identify vendors for 73 items so far. An analysis made in audit revealed that there exists only one vendor for 20 items, two vendors for eight items and three or more vendors for the balance 45 items. This indicated that vendor base for clothing item which is not a high tech item was very limited and therefore, the procurement of these items can not be expected to be competitive.

2.6.3.7 Irregular change of specifications

Subsequent to the transfer of procurement responsibility to HQMC, Directorate of Quality Assurance Services (DQAS) revised specifications of many clothing and general stores like kit bags, mosquito nets, blankets,

durries, etc. which are common for all three Armed Forces. An illustrative list of items with old and revised specifications is given in Annexure-I. Change of specifications tantamount to induction of a new item and as such requires the sanction of Government whenever it is resorted to. No such sanctions have, however, been obtained by IAF in any of these cases. Irregular change of specifications resulted in denial of supply orders to Government production agencies and procurement of items at higher cost due to lack of competition or otherwise as discussed below:

As can be seen from the Annexure I, the changes in specifications are very minor. Nevertheless, consequent to such changes, HQMC and the concerned Depots had to procure items with the changed specifications. This enabled HQMC to avoid placing orders on DGOEF and ACASH and against rate contracts concluded by DGS& D for common user items as discussed at paragraphs 2.6.3.1 and 2.6.3.3 above. Exclusion of Government agencies led to decrease in competition, increase in cost and delays in procurement. In the case of six orders valuing Rs.2.51 crore, the delay ranged from two months to 30 months. HQMC admitted (October 2006) that in certain cases they even deferred the processing of immediate requirements anticipating changes in specifications of items concerned.

Two significant cases of irregular change of specification leading to extra expenditure are discussed below:

(i) **Air Force Blanket Blue**: IAF changed the specification of Blanket Barrack type converting it to Air Force Blanket Blue. Out of 5,96,000 Blankets with changed specification ordered by HQMC, 77 *per cent* (4,58,000) were procured ex-trade and only the balance (1,38,000) were ordered from DGOEF. Blanket Barrack type, which is still in use with the other Armed Forces and under production with Ordnance Factories, costs less than Air Force Blanket Blue. Taking into account the rates at which 4,58,000 of blankets with changed specification were ordered and the production cost of Blanket Barrack at Ordnance Factories, the avoidable extra expenditure consequent to change of specification works out to Rs.3.67 crore.

(ii) **Polyester Mosquito Nets:** Paragraph 3.1 of the Audit Report No.9 of 2005 reported the purchase of Polyester Mosquito Nets on the basis of Proprietary Article Certificate (PAC) by changing their specifications and showing undue indulgence to a particular firm. Action Taken Note on this para is still awaited from the Ministry. Apart from the irregularities in question, the changes in specifications led to incurring of an avoidable expenditure of Rs.0.94 crore.

Thus, irregular change of specifications not only deprived the Ordnance Factories and ACASH of supply orders, but also led to avoidable extra expenditure.

2.6.3.8 Excessive local purchase of clothing and MT stores by units

Local purchase is undertaken within the local purchase powers of the units and formations to meet ad-hoc and urgent requirements. Local purchase may cater for stocking upto three months requirements subject to dues-in being taken into account and within the available budgetary provisions. This will, however, be subject to the monetary ceiling prescribed for the purchasing authorities. Audit examination however disclosed that the units and formations were resorting to excessive local purchases in procurement of clothing and MT stores. Expenditure towards central purchases made by HQMC (including Depot 'R') and local purchases made by units in respect of clothing and MT stores from 2001-02 to 2005-06 are given below:

Comparative position of Central and Local Purchases

(Rs. in crore)

Year	Clothing				MT Stores			
	Central Purchase	Local Purchase	Total	Percentage of LP	Central purchase	Local purchase	Total	Percentage of LP
2001-02	10.59	3.29	13.88	23.70	9.31	18.92	28.23	67.02
2002-03	11.01	3.25	14.26	22.79	7.11	15.50	22.61	68.55
2003-04	12.42	3.73	16.15	23.10	4.65	14.53	19.18	75.76
2004-05	4.04	7.61	11.65	65.32	5.20	15.93	21.13	75.39
2005-06	9.46	12.33	21.79	56.59	2.64	15.68	18.32	85.59
Total	**47.52**	**30.21**	**77.73**	**38.87**	**28.91**	**80.56**	**109.47**	**73.59**

Of the total procurement of clothing stores made during the last five years (2001-06), the expenditure on local purchases was as high as 39 *per cent*. The expenditure on local purchase of clothing increased from 24 *per cent* in 2001-02 to 65 *per cent* in 2004-05 and 57 *per cent* in 2005-06. In the case of MT stores, the position was more alarming and expenditure towards local purchase ranged between 67.02 *per cent* and 85.59 *per cent* with an average of 73.59 *per cent*. The fact that units are resorting to excessive local purchases for clothing and MT stores indicates that either HQMC is continuously failing in taking timely provisioning and procurement action, or the units are irregularly procuring items through local purchase much beyond their delegated powers.

Recommendations

- Requirements for procurement through Government agencies should be complied with.
- Procurement should be transparent and based on greater competition so that IAF can derive benefits of cost reduction and timely supplies. This should be supported by a strong vendor development programme.
- Changes in specification of large consumption items should be a controlled activity and made for transparent reasons and only with the approval of Government.
- Local purchases should be kept to the minimum by effective monitoring and efficient management of central purchase system.

2.6.4 Effectiveness of the provisioning and procurement functions at HQMC and Depots

The central objective of provisioning and procurement is to ensure that supply and repair depots are fully equipped to service supply and repair demands to secure optimum levels of fleet availability and serviceability. The findings of audit on the achievement of the above objectives are given in the ensuing paragraphs.

2.6.4.1 Raising and clearance of AOG demands

The number of AOG demands and time taken to satisfy them are important indicators of the effectiveness of the provisioning and procurement systems of HQMC and the Depots. Audit analysed data with regard to raising of AOG demands and their clearance with respect to ten weapon systems. The analysis of the data held in the AOG Logistics database maintained at HQMC showed that during the 2001-06 period, 26,621 AOG demands were raised for different weapon systems.

The table given below gives details of AOG demands and the time taken to satisfy the same.

AOG Demands and clearance time

Weapon range	Total AOGs	Cleared within time	Within 30 days	1-6 months	7-12 months	Over 1 year
Aircraft 'A'	6637	27	3552	2400	381	277
Aircraft 'B'	1100	4	850	227	10	9
Aircraft 'C'	758	2	451	243	39	23
Aircraft 'E'	3955	4	1831	1601	337	182
Aircraft 'F'	6313	11	2841	2471	692	298
Aircraft 'G'	329	3	190	124	7	5
Aircraft 'H'	2152	10	1450	550	82	60
Aircraft 'J'	496	6	302	176	8	4
Aircraft 'K'	3502	19	2162	1191	87	43
Aircraft 'L'	1379	11	998	339	21	10
TOTAL	**26621**	**97**	**14627**	**9322**	**1664**	**911**
Percentage		**0.36**	**54.95**	**35.02**	**6.25**	**3.42**

Audit analysis disclosed that:

- The raising of AOG demands in such large numbers is indicative of inadequacies in the provisioning function and in supply progression. Year-wise details of AOG are given in Annexure-II. It is apparent that there has been a sharp increase in AOG demands during the last five years.
- Only 97 of the 26,621 AOG demands could be cleared within time, working out to a miniscule 0.36 *per cent*. Thus clearance of almost all the AOG demands was delayed. About 45 *per cent* of the AOG demands were cleared between periods ranging from one month to a year or more against the norm of clearance within a time of 24 hours.

An attempt was also made to analyse the AOG demand satisfaction from the perspective of one user Command to assess the improvement or otherwise in management of AOG demands.

Clearance percentage	2001-02	2002-03	2003-04	2004-05	2005-06
Over 1 year	5.24	2.28	0.30	0.32	0.19
Within 7-12 months	5.24	2.76	2.08	0.74	1.26
Within 1-6 months	41.53	27.17	28.26	21.13	0.00
Within 30 days	41.53	57.95	67.32	71.90	74.43
Within time	**0.00**	**13.70**	**0.19**	**0.42**	**0.72**

According to the user, as seen from the table above, except in 2002-03, less than one *per cent* of its demands were met within prescribed time of 24 hours and average time taken to meet all its AOG demands was between 21 and 159 days during 2001-06.

Though the transfer of procurement functions to HQMC and Depots was expected to lead to better demand management, there are no improvements in this regard as shown above.

2.6.4.2 Satisfaction of other priority demands

As regards "priority demands", in the case of two repair depots and two store depots selected for audit, the demand satisfaction was just 32.*16 per cent* during 2003-06 as shown in the table below:

Satisfaction of Priority Demands

YEAR	TOTAL DEMANDS RECEIVED	WITHIN PRESCRIBED TIME	WITHIN 4-6 MONTHS	WITHIN 7-12 MONTHS	OVER 1 YEAR
2003-04	7197	2477	1481	1704	188
2004-05	8219	2636	1268	1310	1257
2005-06	8704	2643	2105	1889	1028
TOTAL	**24120**	**7756**	**4854**	**4903**	**2473**
percentage		**32.16**	**20.12**	**20.33**	**10.25**
Note: 4134 demands were cancelled during above period					

Thus, 67.84 *per cent* of the priority demands could not be met in time. Raising of other priority demands in substantial numbers combined with poor satisfaction rate indicates faulty provisioning.

2.6.4.3 Satisfaction of demand for clothing items

In respect of clothing items, the transfer of activities did not improve the stock availability. In the pre transfer period, Depot 'R' had achieved *cent per cent* demand satisfaction in respect of clothing items. In the post decentralisation period, however, the demand satisfaction came down from this level and ranged between 74.87 and 98.38 *per cent*. The Depot, in October 2006, stated that failure to achieve *cent per cent* demand was inter-alia attributable to reduction of MPE, revision of specification, increase in demand due to

Clothing Requirements Issue and Supply Procedure (CRISP) pattern, revision of clothing policy and longer procurement lead time from trade sources.

2.6.5 Internal controls

Establishing strong and effective financial and technical controls is vital for efficient material management system and smooth operation of the aircraft fleet and sophisticated systems. The findings of audit with regard to controls are as follows:

2.6.5.1 Reporting and MIS

(a) Logistics and material management in IAF is a complex function and hence it is critical that this function is adequately supported by information and reporting systems that enable availability of timely and credible information on critical aspects such as fleet status, performance of operational fleet and repair and maintenance facilities, forecast of tasks, status of stocks and supplies at storing Depots. It was towards this end that IAF took up development of the Integrated Material Management On Line System (IMMOLS) in 1995. However, the project has taken over a decade to be implemented. IMMOLS has been partially implemented in 22 pilot sites in May 2006 and is under implementation in the rest of 108 sites of IAF.

(b) HQMC discontinued use of critical IT systems such as Supply Progression System (SUPROS) and the AOG Monitoring System in March 2005 and March 2006 respectively anticipating activation of IMMOLS. These systems were processing critical information, and discontinuing these without waiting for IMMOLS to be activated and stabilized was premature and ill advised.

(c) Records of provisioning reviews at HQMC were kept manually in registers and were not suited for generating customised reports needed for monitoring and management control. Key details on supply progression were not provided or updated. This also prevented meaningful audit analysis.

(d) A vital element of any information system is that summary reports should be prescribed and made available to senior management and controlling offices for planning, monitoring and control. It was ascertained that these returns were not prescribed or not used for the purposes of planning, monitoring and control and the greater reliance was placed on review meetings and inspections.

2.6.5.2 Internal Checks and Internal Audit

Procedures and directives for undertaking provisioning and procurements provide for detailed and documented internal checks. Further the Integrated Financial Adviser (IFA) is associated with these processes. No arrangements are in place for an internal audit of provisioning activities. In fact, at Depots IFA functions were given to the Local Audit Officers till October 2003.

Recommendations

- Implementation of IMMOLS should be rolled out at all sites. The changeover process should be carefully managed so that complete and accurate data is ported from manual registers and stand-alone applications. Reports necessary for top-level management control should be generated and used for effective monitoring of key areas.

2.6.6 Institutional arrangements

2.6.6.1 In September 1995, Government accorded sanction for transfer of provisioning/procurement activities of stores from Air HQ to HQMC and the Depots in a phased manner. Audit examined the implementation of the above decision and the main findings are as follows:

(i) IAF did not fix any time frame for the transfer of all the ranges of store to HQMC. Thus, there were considerable gaps between the different phases of transfer of activities. Provisioning and procurement activities of 51 *per cent* of weapon systems still remain with Air HQ.

(ii) Procurement by HQMC is largely limited to clothing and MT spares and to spares ordered ex-HAL. This is because of limited number of ranges transferred to HQMC and the fact that responsibility for undertaking imports, though envisaged as a phase in the decentralization process, was yet to be devolved.

Thus, transfer of provisioning/procurement functions to HQMC and Depots still remain to be fully implemented 11 years after of the Government decision to decentralise these activities.

An objective of the transfer was to relieve Air HQ of the routine and time consuming task of provisioning and thus giving ample time and scope for concentration on policy and techno-logistics discipline and fleet serviceability. Full transfer of responsibility is yet to take place and Air HQ continues to be

responsible for provisioning and procurement of several ranges of materials and for procurement from foreign sources.

Devolution of activities has not had any positive impact on key parameters such as administrative lead time and fleet availability. The absence of a comprehensive information system and the long delay in implementing IMMOLS has hampered monitoring of supplies and production. Audit could also not obtain any evidence of new initiatives being undertaken to rationalise depot operations with the aim of improving stock availability. Rationalisation of stock availability was adversely affected by failure to control lead times.

2.6.6.2 Delay in revision of Policy Pages

Although Govt. approved devolution of powers as a major policy change as early as in September1995 itself, there were inordinate delays in revision of the policy pages of affected units commensurate with changes in their roles. In the case of HQMC, policy page was revised after a delay of nine years six months. As such, during the intervening period, these units were carrying out changed role without proper authority. Further, revision of policy page would have enabled units concerned to seek the required manpower and other infrastructure to enable them to carry out the changed role.

2.6.6.3 Inordinate delay in positioning of IFAs

Financial powers required for undertaking provisioning and procurement were transferred to HQMC and Depots during 1995 and were to be exercised in consultation with IFAs positioned locally. However, there was abnormal delay in the posting of IFAs at the depots which restricted Competent Financial Authorities (CFAs) at depot level from exercising delegated powers. In July 1997, locally available Local Audit Officers were allowed to act as IFA but for amounts lower than the powers of the CFA making it necessary for cases to be sent to the IFA of HQMC for concurrence. IFAs were posted only in various BRDs/EDs in October 2003 by which time further enhancement of financial powers took place. HQMC stated (September 2006) that the CFAs of Depots were not allowed to exercise their powers due to delay in posting of IFAs.

Recommendations

- Devolution of responsibilities should be in conformity with the overall philosophy behind initiating the transfer. As such, a clear road map for transfer of responsibilities with definite time frames and activity schedules should be drawn up and implemented.

- The transfer effected till date should be comprehensively studied and evaluated so that weaknesses are identified and addressed.
- Full and appropriate support infrastructure should be made available to HQMC and the Depots to allow them to exercise their enhanced responsibilities effectively.

2.7. Conclusion

Materials management, including provisioning and procurement, in the IAF is a complex function. Making the task more onerous is the critical bearing it has on the IAF's operational status. Of overriding importance is the need to integrate users, service providers and decision making points so that the materials management function may achieve its ultimate objective of ensuring the availability of the right type of material in the right time at most economic rates. It is towards this end that the IAF has, perhaps, taken its two most important initiatives in the area of material management i.e. the introduction of IMMOLS and the devolution of responsibilities to HQMC and the Depots. However, devolution has been slow and halting and IMMOLS has taken over a decade to take-off. There is thus a strong need to bring and keep these initiatives on track so that the need for reform and change is met.

The matter was referred to Ministry in November 2006; their reply was awaited as of January 2007.

ANNEXURE-I
(Refers to paragraph 2.6.3.7)

LIST OF ITEMS FOR WHICH SPECIFICATIONS WERE CHANGED

Sl No	Item	Letter No. under which revision communicated
1	Durries Small (185x95)	Air HQ/94853/10A/QAS(A) dated 27.08.2004
2	Trouser Polyester and Viscose Blue Grey for Airmen	
3	Fabric for Summer Uniform Shirt	
4	Towel Hand White	
5	Cloth Shirting Blended Polyester and Viscose Light Blue	
6	Caps FS Blue Grey modified pattern	
7	Fabric for Summer Uniform Trouser	
8	Bag Carrying Synthetic (Officers Camp Kit)	
9	Pillow Inflative (officers camp kit)	
10	Jersey Woolen Dark Blue Grey	
11	Blanket Air Force Blue	
12	Cap Balaclava Wool Plain Knitted	
13	T-Shirt Cotton Short Sleeves Knitted	
14	Net Mosquito (Fire Retardant)	
15	Drawer Mens Wool & Rayon	
16	Vest Flying Cold Weather	
17	Tie Neck Polyester Black Universal	
18	Trouser Terrywool BG	
19	Shirt Polyester Viscose Full Sleeve Light Blue for IAF Personnel	
20	Shirt Polyester Viscose Half Sleeve Light Blue	
21	Fabric for Deep Brown Overall	
22	Fabric for Shirt Angola Light Blue and Drab (Airmen)	
23	Vest Cotton Plain Knitted	
24	Fabric for Angola Shirting Light Grey (NCs(E))	
25	Shirt Mens Angola Light Blue Grey	
26	Suit Terrywool BG	Air HQ/94853/10A/QAS(A) dated 20.09.2004
27	Anklet Black	
28	Boot Ankle DMS/DVS	
29	Jacket Combat Disruptive	
30	Fabric Polywool 2x2 Twill Weave	
31	Short Gym White	

32	Belt Waist Synthetic Black	Air HQ/94853/10A/QAS(A) dated 20.09.2004
33	Sheet Barrack	
34	Cloth Pugree BG	
35	Skill Badges	
36	Shoes B/L Oxford DMS	
37	Cap Peak BGOA	
38	Shoes Canvas Blue Oil Resistant Sole	
39	Bag Kit Universal	
40	Shoes Canvas White/Brown	
41	Brief Cotton Rib Knitted	
42	Trouser Disruptive	Air HQ/94853/10A/QAS(A) dated 16.11.2004
43	Scarf Neck Wear Woolen	
44	Socks Nylon Black/White	
45	Socks Woolen	
46	Gloves Woolen Knitted Black	
47	Goggles Protective Field Type E	
48	Overall Deep Brown	
49	Water Bottle	
50	Compartmental Tray	
51	Mug SS	
52	Knife	
53	Forks	
54	Spoon	
55	Brush Shoe Polish	
56	Brush Cloth	
57	Belt Deep Blue Summer Uniform	

ANNEXURE-II
(Refers to paragraph 2.6.4.1)

STATEMENT SHOWING AOG DEMANDS AND CLEARANCE

Aircraft A

Year	Total No. of AOG	Cleared within time		Within 30 days		Within 1-6 months		Within 7-12 months		Over 1 year	
		Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age
2001-02	47	1	2.13	3	6.38	3	6.38	4	8.51	36	76.60
2002-03	175	0	0.00	26	14.86	53	30.29	40	22.86	56	32.00
2003-04	1158	2	0.17	462	39.90	438	37.82	128	11.05	128	11.05
2004-05	2395	8	0.33	1349	56.33	829	34.61	153	6.39	56	2.34
2005-06	2862	16	0.56	1712	59.82	1077	37.63	56	1.96	1	0.03
TOTAL	**6637**	**27**	**0.41**	**3552**	**53.52**	**2400**	**36.16**	**381**	**5.74**	**277**	**4.17**

Aircraft H

Year	Total No. of AOG	Cleared within time		Within 30 days		Within 1-6 months		Within 7-12 months		Over 1 year	
		Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age
2001-02	14	0	0.00	2	14.29	5	35.71	1	7.14	6	42.86
2002-03	36	0	0.00	11	30.56	6	16.67	5	13.89	14	38.89
2003-04	106	0	0.00	47	44.34	32	30.19	5	4.72	22	20.75
2004-05	765	2	0.26	438	57.25	250	32.68	58	7.58	17	2.22
2005-06	1231	8	0.65	952	77.34	257	20.88	13	1.06	1	0.08
TOTAL	**2152**	**10**	**0.46**	**1450**	**67.38**	**550**	**25.56**	**82**	**3.81**	**60**	**2.79**

Aircraft E

Year	Total No. of AOG	Cleared within time		Within 30 days		Within 1-6 months		Within 7-12 months		Over 1 year	
		Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age
2001-02	36	0	0.00	1	2.78	0	0.00	5	13.89	30	83.33
2002-03	460	1	0.22	171	37.17	150	32.61	61	13.26	77	16.74
2003-04	1148	0	0.00	558	48.61	469	40.85	90	7.84	31	2.70
2004-05	1087	1	0.09	565	51.98	402	36.98	81	7.45	38	3.50
2005-06	1224	2	0.16	536	43.79	580	47.39	100	8.17	6	0.49
TOTAL	**3955**	**4**	**0.10**	**1831**	**46.30**	**1601**	**40.48**	**337**	**8.52**	**182**	**4.60**

Aircraft F											
Year	Total No. of AOG	Cleared within time		Within 30 days		Within 1-6 months		Within 7-12 months		Over 1 year	
		Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percentage	Nos.	Percentage
2001-02	544	5	0.92	305	56.07	182	33.46	35	6.43	17	3.13
2002-03	1058	1	0.09	520	49.15	366	34.59	82	7.75	89	8.41
2003-04	1468	5	0.34	584	39.78	592	40.33	208	14.17	79	5.38
2004-05	1736	0	0.00	907	52.25	589	33.93	143	8.24	97	5.59
2005-06	1507	0	0.00	525	34.84	742	49.24	224	14.86	16	1.06
TOTAL	**6313**	**11**	**0.17**	**2841**	**45.00**	**2471**	**39.14**	**692**	**10.96**	**298**	**4.72**

Aircraft G											
Year	Total No. of AOG	Cleared within time		Within 30 days		Within 1-6 months		Within 7-12 months		Over 1 year	
		Nos.	Percet-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percentage
2001-02	1	0	0.00	0	0.00	1	100.00	0	0.00	0	0.00
2002-03	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2003-04	14	0	0.00	9	64.29	2	14.29	0	0.00	3	21.43
2004-05	196	1	0.51	101	51.53	86	43.88	6	3.06	2	1.02
2005-06	118	2	1.69	80	67.80	35	29.66	1	0.85	0	0.00
TOTAL	**329**	**3**	**0.91**	**190**	**57.75**	**124**	**37.69**	**7**	**2.13**	**5**	**1.52**

Aircraft J											
Year	Total No. of AOG	Cleared within time		Within 30 days		Within 1-6 months		Within 7-12 months		Over 1 year	
		Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age
2001-02	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2002-03	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
2003-04	15	0	0.00	3	20.00	4	26.67	5	33.33	3	20.00
2004-05	236	4	1.69	145	61.44	84	35.59	2	0.85	1	0.42
2005-06	245	2	0.82	154	62.86	88	35.92	1	0.41	0	0.00
TOTAL	**496**	**6**	**1.21**	**302**	**60.89**	**176**	**35.48**	**8**	**1.61**	**4**	**0.81**

Aircraft K

Year	Total No. of AOG	Cleared within time		Within 30 days		Within 1-6 months		Within 7-12 months		Over 1 year	
		Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age
2001-02	12	0	0.00	3	25.00	5	41.67	1	8.33	3	25.00
2002-03	30	1	3.33	13	43.33	3	10.00	5	16.67	8	26.67
2003-04	53	0	0.00	17	32.08	19	35.85	4	7.55	13	24.53
2004-05	1252	4	0.32	735	58.71	449	35.86	48	3.83	16	1.28
2005-06	2155	14	0.65	1394	64.69	715	33.18	29	1.35	3	0.14
TOTAL	**3502**	**19**	**0.54**	**2162**	**61.74**	**1191**	**34.01**	**87**	**2.48**	**43**	**1.23**

Aircraft B

Year	Total No. of AOG	Cleared within time		Within 30 days		Within 1-6 months		Within 7-12 months		Over 1 year	
		Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age
2001-02	18	0	0.00	6	33.33	8	44.44	0	0.00	4	22.22
2002-03	17	0	0.00	13	76.47	3	17.65	1	5.88	0	0.00
2003-04	19	0	0.00	9	47.37	6	31.58	0	0.00	4	21.05
2004-05	235	1	0.43	179	76.17	46	19.57	8	3.40	1	0.43
2005-06	811	3	0.37	643	79.28	164	20.22	1	0.12	0	0.00
TOTAL	**1100**	**4**	**0.36**	**850**	**77.27**	**227**	**20.64**	**10**	**0.91**	**9**	**0.82**

Aircraft C

Year	Total No. of AOG	Cleared within time		Within 30 days		Within 1-6 months		Within 7-12 months		Over 1 year	
		Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age
2001-02	15	0	0.00	2	13.33	3	20.00	3	20.00	7	46.67
2002-03	23	0	0.00	10	43.48	4	17.39	1	4.35	8	34.78
2003-04	23	0	0.00	11	47.83	4	17.39	3	13.04	5	21.74
2004-05	220	1	0.45	108	49.09	89	40.45	21	9.55	1	0.45
2005-06	477	1	0.21	320	67.09	143	29.98	11	2.31	2	0.42
TOTAL	**758**	**2**	**0.26**	**451**	**59.50**	**243**	**32.06**	**39**	**5.15**	**23**	**3.03**

Aircraft L											
Year	Total No. of AOG	Cleared within time		Within 30 days		Within 1-6 months		Within 7-12 months		Over 1 year	
		Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age	Nos.	Percent-age
2001-02	5	0	0.00	0	0.00	4	80.00	0	0.00	1	20.00
2002-03	15	0	0.00	5	33.33	7	46.67	1	6.67	2	13.33
2003-04	20	0	0.00	4	20.00	11	55.00	2	10.00	3	15.00
2004-05	383	4	1.04	252	65.80	107	27.94	16	4.18	4	1.04
2005-06	956	7	0.73	737	77.09	210	21.97	2	0.21	0	0.00
TOTAL	1379	11	0.80	998	72.37	339	24.58	21	1.52	10	0.73

GLOSSARY

ACASH	Association of Corporation and Apex Societies of Handloom
AIR HQ	Air Headquarters
AOC	Air Officer Commanding
AOG	Aircraft On Ground
BPC	Bulk Production Clearance – Refers clearance given to supplier by Inspector after technical approval of the pilot sample/prototype
BRD	Base Repair Depot
CAR	Current Annual Rate – means average annual recurring consumption including dues out but not materialized. This is calculated upto a maximum period of five years.
CFA	Competent Financial Authority
CRISP	Clothing Requirements Issue and Supply Procedure – The estimation of these items is based on the scale per person, life of the item and MPE period
DGOEF	Director General Ordnance Equipment Factories
DGQA	Director General Quality Assurance
DGS&D	Director General Supplies & Disposal
DQAS	Directorate of Quality Assurance Services
ED	Equipment Depot
FF	Forecast Factor – The ratio between the forecasted future strength and/or effort and actual strength and/or effort
HAL	Hindustan Aeronautics Limited
HQMC	Headquarters Maintenance Command
IAF	Indian Air Force
IAP	Indian Air Publication
IFA	Integrated Financial Adviser
IMMOLS	Integrated Material Management On Line System
IOR	Immediate Operations Requirement
JCDA	Joint Controller of Defence Accounts

JD(QAS)	Joint Director (Quality Assurance Services)
Life of Type Review	This is the final review carried out to provision all ranges of spares of an aircraft or equipment before the manufacturer goes out of production. This review is undertaken to provision all ranges of spares of an aircraft or equipment, when intimation is received from the manufacturers that further production of those spares will be discontinued after a specified time.
LPO	Local Purchase Order
MCM	Most Critical Material
MIS	Management Information System
MPE	Maximum Potential Establishment – The level upto which various types of stores/equipment are authorised to be provisioned at any given time. It is expressed in terms of so many months' requirements and denotes the period ahead for which requirement of equipment must be provisioned in bulk. Also known as the forward ordering period.
MT	Mechanical Transport
OEM	Original Equipment Manufacturer
PAC	Proprietary Article Certificate
PHU	Production Hold Up
PR	Provisioning Review
PSU	Public Sector Undertaking
RMSO	Repair Manufacture & Supply Order
SOR	Schedule of Requirement
SUPROS	Supply & Progression System
URR	Urgent Repair Requirement
USR	Urgent Service Requirement

MINISTRY OF DEFENCE

INDIAN NAVY

MANAGEMENT OF EQUIPMENT IN NAVAL DOCK YARDS, MUMBAI AND VISAKHAPATNAM

Chapter III: Management of Equipment in Naval Dockyards, Mumbai and Visakhapatnam

Highlights

- Planning and contracting of replacement of equipment at both dockyards disclosed shortcomings. As a result several old, ageing, BER and obsolete equipment were awaiting replacement for long periods.

  (Paragraph 3.7.1.1 & 3.7.2)

- Creation of repair and maintenance facilities to cater for new acquisitions of naval vessels often did not progress in step with requirements.

  (Paragraph 3.7.1.2)

- A test stand urgently required for testing overhauled radial engines of ships, procured at a cost of Rs 2.36 crore in October 2004 is yet to be commissioned in Naval Dockyard at Mumbai (ND(MB)). At Naval Dockyard Vishakhapatnam (ND(V)) the delay in procurement of a welding machine costing Rs 0.45 crore resulted in off-loading of welding work amounting to Rs 0.77 crore to trade.

  (Paragraph 3.7.2.1 & 3.7.2.2)

- In ND (MB) there was no record of planned maintenance being undertaken in the case of the 50 machines selected for detailed audit. In ND (V), procedures for preventive maintenance were evolved only in 2002. The dockyard placed reliance only on "First Line Maintenance" (FLM) for more than 98 *per cent* of the machines.

  (Paragraph 3.8.1)

- Maintenance was predominantly reactive to breakdowns and defects. In ND (MB), record of defects and repairs were inadequately maintained. In ND (V), records of defects and

repairs did not provide details of spares used. Repairs in both dockyards also took considerable time to complete in a number of cases. Repair tasks were also off-loaded to trade but also suffered from delays.

(Paragraph 3.9)

- Neither dockyard adopted a policy of forecasting requirement of spares and stocking the same. Procurement of spares was undertaken only when repairs were on hand. These procurements, however, in most cases took considerable time to complete.

(Paragraph 3.10)

- Incomplete details in work instructions and machine log books rendered managerial monitoring of performance more difficult. Recording and review of reworks was inadequate.

(Paragraphs 3.12.1 & 3.12.2)

Summary of Recommendations

- At the apex level, expenditure management and acquisition of plant and machinery should be monitored properly in order to ensure effective utilization of funds allotted and timely procurement.
- The Long Term Replacement Plans, BER approvals and Shor Term Operating Cost Plan (STOPS) should be linked with each other and should have cross reference to ensure that procurement of machines adhere to Long Term Replacement Plans and STOPs.
- Replacement of BER machines should be done in an expeditious and time bound manner.
- ND (MB) should undertake scheduled preventive maintenance as per codal provisions.
- In ND (V) implementation of FLM should be closely monitored and scope of Plant Preventive Maintenance (PPM) should be enlarged to cover all critical machines.
- ND (MB) should create an electronic database of all complaints of machinery defects registered with Plant Maintenance Department.

- Machine History Cards should be maintained with all required details in the prescribed format in respect of all critical equipment at the dockyards.
- Both the dockyards should assess and prescribe dates for repairs, and monitor repair jobs against the same.
- The dockyards should closely monitor off-loaded repair jobs so that these are completed expeditiously and equipment put to use without delay.
- Procurement of spares should be closely monitored so that time taken for the same is minimised.
- The Naval Dockyard should utilise the "cash and carry" powers delegated to them to expedite procurement of spares so that constraints in repairs are addressed.
- Dockyards should carry out annual reconciliation of records of plant and machinery held by them and the Capital Block Register maintained by the costing section of PCDA (Navy). These records should also be kept up to date.
- Annual physical stock verification must be taken up in accordance with the laid down procedures.
- Work instructions should contain all necessary details to facilitate effective monitoring of plant and machinery operations.
- Each work centre should maintain a complete record of re-works in a prescribed and uniform format.

3.1 Introduction

Naval Dockyards located at Mumbai and Vishakapatnam primarily undertake "refits" of naval ships and submarines. Refits are planned, periodic comprehensive repair and maintenance exercises, and are classified as short, normal, medium and long. The Dockyards also carry out emergency repairs of ships and submarines. These dockyards are thus critical for the operational preparedness of the ships, crafts and submarines of the Indian Navy.

The Directorate of Dockyards (DODY) at Naval Headquarters exercises control over the infrastructure-related activities of the Dockyards. DODY is also responsible for formulating policies and plans regarding modernization, augmentation and renewal of facilities, including plant and machinery, in Naval Dockyards.

3.1.1 Naval Dockyard, Mumbai

The 250-year old Naval Dockyard at Mumbai (ND (MB)) caters to repair and refits of naval ships and submarines of Western Naval Command of indigenous and western make. It is equipped with berthing, docking and modern workshop facilities needed for ship repairs and refits. It has 101 Work Centres, and employs over 10,000 personnel. The Dockyard carried out 157 refits during 2001-06 involving an expenditure of Rs 1521.21 crore.

3.1.2 Naval Dockyard, Visakhapatnam

The Naval Dockyard at Visakhapatnam (ND (V)) carries out planned refits of ships and submarines of the Eastern Naval Command. The dockyard is equipped with 28 jetties, 3 dry docks, and 90 Work Centres. Eight thousand employees, besides Naval officers and men, are employed by this dockyard. The Dockyard carried out 112 refits during 2001-05 at a total cost of Rs 619.30 crore. Annual works and Production accounts for 2005-06 had not been finalised as of December 2006.

3.2 Scope of audit

Naval Dockyards hold a large number and diverse range of equipment to conduct repairs and refits on various classes of ships and submarines. Effective management of equipment has critical bearing on the capability of these dockyards to undertake timely, economical refits and repairs of ships and submarines in accordance with the operational requirements of the Navy. The purpose of this audit is thus to study various aspects of the management of these equipment. Focus has been placed on aspects such as maintenance, operation and utilization, replacement and augmentation of installed equipment in the dockyards. The period covered by this study is five years starting from 2001-02. Audit was carried out at Naval Headquarters i. e DODY; ND (MB) and ND (V).

3.3 Audit objectives

The two primary objectives of this audit exercise are:

- To assess whether plant and machinery are being replaced, renewed and augmented in time keeping with the functional requirements of the dockyards.
- To assess whether plant and machinery available in the Naval dockyards are being maintained and operated in an efficient and effective manner.

3.4 Audit criteria

- Roll-on-Plans for replacement of plant and machinery.
- Norms for maintenance of plant and machinery as per Dockyard Manuals and NHQ instruction.
- Procurement instructions of Ministry of Defence.
- Adherence to approved time frame for creation of supporting maintenance infrastructure for new ships.
- Codal requirements for record maintenance relating to holding, operation and maintenance of equipment
- Tolerance period for repairs of plant and machinery

3.5 Audit methodology

At ND (MB), there are 101 Centres, of which 36 Centers were taken up for study. At ND (V), 24 of the 90 Centres were taken up for study.

Centres were selected on the basis of volume of work carried out, criticality with regard to refit activities undertaken and the number of machines owned. The selected centers cover the Electrical, Engineering, Hull & Weapons disciplines.

Audit methodology included:

- Interviews with key staff within each centre.
- Issuing a questionnaire to departments and obtaining information with regard to 506 machines at ND (MB) and 536 machines at ND (V) on performance, repair and maintenance policy.
- Validation of responses to questionnaires with regard to efficiency of operation and maintenance of 50 machines selected on the basis of their criticality to Naval Dockyard operations.
- Scrutiny of cases involving acquisition of plant and machinery.
- Examination of records at the Naval Headquarters i.e. at DODY.

Audit Findings

3.6 Allotment of Funds and Expenditure on procurement of machinery and spares

In ND (MB) there are 101 work Centres which hold 3185 machines. In ND(V), there are 90 Work Centres holding 5199 machines. The position relating to allotment of funds and expenditure on procurement of machinery and spares in respect of DODY, ND (MB) and ND (V) during 2002-06 was as given in the table below:

(Rs in lakh)

Year		Local Purchase			Central Purchase		
		Allotment	Expenditure	Excess(+)/ Surrender(-)	Allotment	Expend-iture	Excess(+)/ Surrender(-)
2002-03	DODY	NIL	NIL	NIL	377.45	178.45	(-) 199.00
	ND (MB)	300.00	260.34	(-) 39.66	-	-	-
	ND(V)	293.50	439.34	(+) 145.84	-	-	-
2003-04	DODY	NIL	NIL	NIL	237.99	237.97	-
	ND (MB)	135.00	121.30	(-) 13.70	125.92	NIL	(-) 125.92
	ND(V)	652.00	505.48	(-) 146.52	58.81	4.20	(-) 54.61
2004-05	DODY	NIL	NIL	NIL	298.24	298.24	-
	ND(MB)	80.00	77.20	(-) 2.80	30.50	13.77	(-) 16.73
	ND(V)	636.00	675.72	(+) 39.72	95.00	68.69	(-) 26.31
2005-06	DODY	NIL	NIL	NIL	410.00	313.66	(-) 96.34
	ND(MB)	150.00	100.00	(-) 50.00	50.00	31.52	(-) 18.48
	ND(V)	690.00	586.24	(-) 103.76	64.00	52.13	(-) 11.87
Total		**2936.50**	**2765.62**		**1747.91**	**1198.63**	

(Source: Modified Appropriation for the year from 2002-2003 to 2005-2006)

Against the total allocation of Rs 46.84 crore during 2002-06, the actual expenditure on procurement of machinery and spares under local and central purchase in DODY, ND(MB) and ND(V) was Rs 39.64 crore indicating a saving of 15.37 *per cent*. Savings were significant in ND(V) under local purchases during 2003-04 and 2005-06 and in DODY under central purchase for years 2002-03 and 2005-06. The entire allocation of Rs 1.25 crore to ND(MB) under central purchase also remained unspent during 2003-04. Persistent savings indicate that the procurement of the machinery and spares is not properly planned to ensure full utilisation of allotted funds.

3.7 Audit findings related to acquisition of plant and machinery

Acquisition of equipment is critical for:

(i) maintaining existing capabilities by identifying and replacing old, obsolete and BER equipment in a timely and cost effective manner; and

(ii) creating new capabilities to support new acquisitions of ships and submarines.

Key aspects of the acquisition process adopted in the two dockyards including the system of internal controls were examined during audit.

3.7.1 Planning of acquisitions

Distinct planning tools exist for the two different kinds of acquisitions undertaken by dockyards as stated above.

3.7.1.1 Planning acquisitions for replacements

Naval Headquarters formulated and issued guidelines in September 1999 and January 2002 for planning and replacement of old and BER equipment in both the dockyards. These guidelines envisage preparation of a long-term replacement plan, covering replacements envisaged, for a five year period. These plans are prepared on the basis of proposals for replacements submitted by user departments made after a preliminary assessment of the material state of equipment. As this plan is updated annually it is in the nature of a roll-on-plan (ROP). Following approval of the long-term replacement plan by Naval Headquarters (NHQ), the dockyard constitutes a Board of Officers (BOO) to survey machines proposed for replacement. BER proceedings are taken up on the recommendations of the Board. Once these proceedings are approved by NHQ cases of replacements are included in Short Term Operating Plans (STOPS) which are of three years duration. STOPS are prepared each year based on indicative budget for the ensuing three year period. Individual acquisitions are taken up either by the dockyard/ Naval Commands/MOD based on available delegation of financial powers.

ND(V)

Audit examination at ND (V) disclosed the following shortcomings:

i) No Five-Year Long Term Replacement Plan for ND (V) existed. As such ND(V) did not comply with NHQ guidelines in this regard.

ii) As the delegated powers to Dockyard have been enhanced, it had stopped reflecting acquisitions planned within its own powers in the STOPS sent to DODY. Thus, STOPs did not reflect the complete picture of planned procurements.

iii) The status of procurements during the last 5 years with reference to STOPS is given in the table below:

Estimate of the plan year	Number of machines projected for procurement	Number of procurements made	Fulfilment of Plan (Per cent age)
2001-02	268	130	48.51
2002-03	297	119	40.07
2003-04	154	89	57.79
2004-05	151	88	58.28
2005-06	127	93	73.23

Thus the number of machines procured during each year was much below the number of machines projected for replacement during the year under STOPS. The extent of shortfall between projections and procurements ranged between 27 to 60 *per cent* during the last five years

iv) Replacement of BER machines were not being carried out promptly. Data with regard to replacement of BER machines of nine departments showed that of the 433 machines declared BER during 1991 to 2003, only 238 had been replaced as of March 2006. Seventeen machines were stated to be no longer required and replacement of eighteen machines were under process. Replacement of 160 machines were yet to be taken up. Audit noticed that 35 of the machines for which replacements were pending were declared BER in the 1990s.

v) There was no linkage between two consecutive STOPS and items projected as additional requirement in a year and remaining unprocured at the end of the year were not progressed to subsequent years.

vi) Approval of BER is not recorded in STOPS or in the supply orders and as such progress of replacement cases from one stage to another cannot be effectively monitored.

ND (MB)

Audit examination of the procurement planning process at ND (MB) disclosed the following deficiencies:

(i) The first long term replacement plan (1998-99 to 2002-03) was approved in 1998. No records were available at DODY to show that the long term plan due in 2000 had been approved by them. As such there is no assurance that replacements are being carried out as per plan approved by NHQ.

(ii) Though long-term plans were updated each year, it was found that all pending cases of one year were not being carried forward to the updated plan of the next year.

(iii) It was difficult to verify replacement of equipment with reference to long term replacement plans as equipment included in STOPS had not been cross-referenced to the long term plan.

(iv) The position with regard to procurements completed in three critical departments at ND (MB) in respect of Long Term Replacement Plans for 2001-06 and 2002-07 is given in the table below:

Sl. No.	Department	Plan period	Cases projected in Plan	Cases pending	Percentage shortfall
1	MBEF	2001-2002 to 2005-06	35	12	34.29
		2002-2003 to 2006-07	27	24	88.89
2	MDD & HP	2001-02 to 2005-2006	30	16	53.33
		2002-03 to 2006-07	nil	-	-
3	MWEA	2001-02 to 2005-06	42	35	83.33
		2002-2003 to 2006-07	60	60	100
Total			**194**	**147**	

Shortfalls against replacements projects were as high as 83 to 100 *per cent* in the critical Weapons Department.

As such in both the dockyards replacement of old and ageing equipment was not being planned and implemented efficiently.

3.7.1.2 Planning for acquisition of equipment for repair and maintenance of newly acquired naval vessels

Acquisition of equipment for repair and maintenance of new ships and submarines are normally approved by the Competent Financial Authority as part of the proposal for buying the new assets. For this purpose, appropriate shore support facilities are required to be set up with requisite equipment, jigs and fixtures, tools and equipment. Audit has made observations in the past about maintenance and support facilities not being synchronised with the acquisition of naval vessels. Consequently, only the lowest level of repairs (mostly short refits) could be undertaken in the dockyards, which stretched the existing resources, leading to postponement or off-loading of scheduled refits. Observations contained in Paragraph 19 of Comptroller & Auditor General's Report No. 9 of 1991 and 16 of the Comptroller & Auditor General's Report No. 8 of 1997 are relevant in this regard. NHQ in July 1988 issued instructions which were also ratified by Ministry in 1996 for adoption of an improved procedure and formulation of DPRs for these support facilities as a prerequisite to obtaining the Competent Financial Authority's approval for acquisition of new naval vessels. Despite this, augmented facilities for repair and overhaul of stealth frigates, contracted during 1997 and commissioned between June 2003 and April 2004, are yet to be created (May 2006) in ND (MB), ND (V) and INS Eksila. The contract for framing DPRs for these facilities was signed with the OEM only in March 2004 and the DPR was received by Navy in September 2005.

Delays disclosed in setting up repair and maintenance facilities adversely affects the capability of dockyards to effectively undertake repair and refit tasks with regard to newly inducted ships and submarines.

3.7.2 Contracting and ordering of replacement equipment

Procurement and contracting of equipment is required to comply with procedures and timeframes prescribed vide orders issued by the Ministry of Defence from time to time. These are also required to comply with delegation of financial powers for procurement of equipment vested in the dockyards, Naval Commands and Naval HQ. All procurements beyond these delegated powers require the approval of the Ministry.

3.7.2.1 Delay in procurement by NHQ

During the period 2001-02 to 2005-06, 13 procurement cases relating to replacements were processed by NHQ. Five of these procurements valuing Rs 12.24 crore were examined by Audit. Audit examination revealed

abnormal delays in obtaining sanction for procurement and undertaking procurement and commissioning activities. These are discussed below:

(i) **Special Purpose Test Stands for Radial Engines**: Replacement of special purpose Test Stands for radial engines was envisaged as early as February 1997. However, this procurement was included only in the STOPs for 2001-02 and sanction for procurement at a cost of Rs 239 lakh on proprietary article certificate (PAC) basis was accorded in March 2002. Contract was concluded in October 2002 with M/s ZVEZDA Trade Ltd for USD 486,888.50 (Rs 235.51 lakh) for supply of these Test Stands. The Test Stands though received in October 2004 were taken in stock only in December 2005 after a delay of over one year. However, the Test Stands are yet to be commissioned (December 2006) due to defects in the equipment received which are yet to be rectified. In the absence of these Test Stands, the dockyard has to use time consuming alternate methods for testing overhauled engines.

(ii) **HP Air Compressor**: Two HP air compressors were declared BER in June 1993. However, the replacements for these compressors were included only in the STOPs for 2001-02 i.e after a gap of eight years Supply Order for procurement of two numbers of HP Air Compressors at a cost of Rs 110 lakh was placed by Naval HQ on M/s Sulzar India Ltd in April 2002. The Air compressors were received in November 2002 and commissioned in January 2003. During the intervening period (1992-2003) the dockyard had to manage its works with the help of HP Air Compressor (400 bar) taken on temporary loan from another Naval Unit. It was thus seen that a critical replacement needed for overhaul of submarine parts during refits was delayed by almost a decade by the dockyard.

(iii) **Portal Crane**: The necessity for replacement of this 1946 vintage crane was assessed by a BOO in June 2003. However, proceedings of the Board was sent to Naval HQ for approval only in February 2005. Sanction for the replacement of the item at a cost of Rs 6.75 crore was issued by Naval HQ in July 2005. The Directorate of Procurement (DPRO) at Naval HQ took 10 months in placing the supply order as against a maximum of 7 months prescribed by the Ministry.

(iv) **Universal Folding Machine**: The proposal for procurement of Universal Folding machine as a replacement was approved by Naval HQ in June 1991. However, ND (MB) initiated the case for obtaining CFA's approval only in October 1996. The CFA took another 31 months in according its sanction for procurement and DPRO took another 12 months in placing the supply order as against a maximum

of seven months stipulated by Ministry. The machine was received in March 2001 and installed/commissioned in August 2001. Thus, there was an overall delay of 10 years in replacing this machine which the dockyard itself acknowledged had developed major cracks in 1991 and was being used to limited capacity since then.

(v) 30 ton Mobile Cranes: BOO assembled in June 2000 and November 2000 recommended replacement of one each 12 ton and 25 ton mobile cranes with two 30 ton mobile cranes. The replacement proposals were approved by Naval HQ in January 2001 and March 2001 respectively. Thereafter dockyard took another year in obtaining sanction of Naval HQ for purchase of new cranes which was finally accorded in April 2002 at a cost of Rs 180 lakh. After floating a limited tender enquiry in May 2002, a contract was concluded in September 2002 for the procurement of these two cranes. The cranes were received and commissioned in February/March 2003.

The abnormal delays in replacement of major plant and machinery indicated poor monitoring of the replacement process and deficient contract management both in NHQ and the Dockyards.

3.7.2.2 Delays in procurement of replacement equipment by dockyards

In ND (MB) there were 434 cases of procurement of replacement equipment between 2001-02 to 2005-06. Out of these, all 87 cases of procurement relating to shop floor machines were scrutinised during audit. Audit findings are as follows:

- In 57 cases (65.52 *per cent* of the cases test checked), there were delays ranging from one to 23 months in placing of supply orders after approval, over and above the maximum stipulated period of seven months by the Ministry.
- In 51 cases (58.62 *per cent*), there were delays in installation of the machines even after its receipt in the dockyard. Such delays ranged from six to 317 days.

In ND (V), there were 483 cases of procurement during 2002-03 to 2005-06. Out of these all the 57 cases pertaining to shop floor machines were scrutinised by Audit. The audit findings are as follows:

- In 28 cases (49.12 *per cent*) there were delays ranging from one to 19 months in placing supply orders/contracts after approval over and above the maximum period of seven months stipulated by Ministry.

- In one case NHQ in March 2001 approved the disposal of Argon Arc Welder and its replacement with Orbital Tig Welding Machine. The machine was urgently required for undertaking welding jobs in INS Sidhudhwaj which was undergoing medium refit since July 1999. The dockyard, however, placed the supply order only in October 2004 at a cost of Rs 45 lakh and the machine was commissioned in January 2005. Consequent to the delays in initiating and finalising the supply order, the dockyard had to off-load the welding work of INS Sindudhwaj to trade at a cost of Rs 76.55 lakh. Thus, the delay in procurement of welding machine valuing Rs 45 lakh resulted in unnecessary off-loading of welding work to trade at a cost of Rs 76.55 lakh.

3.7.3 Adequacy and efficacy of controls over the acquisition process

DODY is required to maintain a master list of equipment existing in each dockyard. However, such a list could not be produced to audit. As such there was no assurance that Naval HQ and DODY could effectively monitor availability of equipment at dockyards, consider and approve Long Term Replacement Plans and BER cases and undertake augmentation and up-gradation of facilities. Further, it was seen that replacement of machines was more with reference to age than with technological obsolescence.

Recommendations

- At the apex level, expenditure management and acquisition of plant and machinery should be monitored properly in order to ensure effective utilization of funds allotted and timely procurement.
- The Long Term Replacement Plans, BER approvals and Short Term Operating Cost Plan (STOPS) should be linked with each other and they should have cross reference to ensure that procurement of machines adhere to Long Term Replacement Plans and STOPs.
- Replacement of BER machines should be done in an expeditious and time bound manner.

3.8 Preventive Maintenance of Equipment

3.8.1 ND (MB)

The Naval Dockyard Shop Floor Maintenance Manual lays down preventive maintenance schedules for plant and machinery. The Plant Maintenance Department is responsible for maintaining equipment-wise records for planned preventive maintenance. Audit survey was done of 11 Centres holding the 50

selected machines to ascertain whether the Centres complied with the codal requirement of prescribing and implementing preventive maintenance schedules. It was observed that there was no record of scheduled preventive maintenance being undertaken for any of these 50 machines by the Centres.

Further the dockyard did not have any organization-wide maintenance plan for equipment held by it. On the contrary the Plant Maintenance Department stated that machines fitted on the shop floor did not require maintenance as prescribed by the original equipment manufacturer (OEM) as most of these were not required to be operated all the time. This position is not tenable as implementation of a planned preventive maintenance schedule for all equipment reduces risks of unscheduled stoppages and breakdowns. It was a codal requirement.

3.8.2 ND (V)

Preventive maintenance undertaken at ND (V) envisaged maintenance at two levels viz. First Line Maintenance (FLM) schedule and Preventive Plant Maintenance (PPM) schedule.

First Line Maintenance

Regular FLM of plant and machinery was vital for ensuring longevity and greater availability of plant and machinery. In order to ensure that the departments undertake FLM tasks effectively, ND (V) promulgated a procedure for FLM in November 2004. Audit scrutiny disclosed that FLM was not being observed in compliance with the procedure prescribed in the following respects:

- ✓ At shop-floor levels nomination of personnel as in-charge of each of the equipment had not been done.
- ✓ Daily maintenance routines were not displayed on the machines.
- ✓ Supervisory authorities did not hold any records of reviews of FLM that they were required to conduct under the 2004 procedure. It also had no record of discrepancies noted in the conduct of FLM.
- ✓ Maintenance log books were not available for 32 out of the 50 machines selected by Audit for detailed scrutiny.

Preventive Plant Maintenance

ND (V) also undertakes Preventive Plant Maintenance schedules as part of its preventive maintenance policy which came into existence in January 2002. Prior to this, it was confirmed by the Dockyard that there was only a policy of

breakdown maintenance. However such maintenance is limited to 50 machines, identified as critical, out of 3535 machines held by the dock yard.

Catering to the maintenance needs of a large number of machines only through FLM would appear to be inadequate since the number of breakdowns at Naval Dockyard (V) for the last three years ranged from 1553 to 1816 per year.

The Dockyard authorities stated that PPM was restricted to only 50 machines on account of resource and manpower constraints. This stand of the dockyard is not acceptable as on one hand Dockyard did not fully utilise the allocations as discussed at para 3.6 above, on the other hand no alternative strategy or plan was evolved for extending the coverage of PPM.

Recommendations

- The ND (MB) should undertake scheduled maintenance as per codal provisions.
- In ND (V) implementation of FLM should be closely monitored and scope of PPM should be enlarged to cover all critical machines.

3.9 Breakdown Maintenance and Repairs

3.9.1 ND (MB)

Breakdown maintenance is undertaken when a user department reports a breakdown or defect to the Plant Maintenance Department (PMD). The breakdowns /defects are reported by making entries in complaint registers kept with the Plant Maintenance Department. The PMD then rectifies the defects.

3.9.1.1 Documentation of breakdowns

Audit survey of the procedure followed by the nine departments in ND (MB) for handling breakdowns and defects disclosed that:

- ✓ No uniform procedure for documenting complete details of incidents of breakdowns/defects existed. Consequently, information on breakdowns and the resultant repairs carried out was not available for equipment-wise collation and had limited utility for management and control of the maintenance process.
- ✓ Dockyard had in general not complied with the requirement, in terms of Naval Dockyard Standing Order 2001, of maintaining Machine

History Cards for each machine tool. Out of 74 machines surveyed, it was found that prescribed history cards were not maintained in respect of 46 machines. As such consolidated information on breakdowns and repairs undertaken for different machines were not maintained, further compromising the effectiveness of management control over equipment.

3.9.1.2 Inordinate time taken for repair

Audit scrutiny of records of 503 cases of breakdowns/defects available with PMD and their rectification relating to the period 2001 to 2006 revealed that in 396 cases repairs were completed within one month and in 81 cases it took between one to three months. In 16 cases repairs took between three to six months and in 10 cases it took more than six months to complete.

ND (MB) attributed the long time taken to difficulties in sourcing spares, as most of their machines were of old period.

Contracts for off-loading repair tasks entered into during 2002-03 to 2005-06 examined in audit showed that failure to initiate and complete repairs caused machines to remain non-operational for periods ranging from 72 to 793 days. In most of the cases it was seen that the total period for which the machine was not operational far exceeded the actual time taken for completion of repairs

Recommendations

- Machine History Cards should be maintained with all required details in the format in respect of all equipment at the Dockyards.

3.9.2 ND (V)

Audit assessed the time taken to complete repairs undertaken during the last three years 2003, 2004 and 2005. Audit scrutiny of 1079 repairs revealed that in 885 cases repairs were carried out within one month in 128 cases it was done between one to three months, in 42 cases between three to six months and in 24 cases more than six months. Plant Maintenance Department attributed the delays to spares and manpower constraints.

In case of non-availability of know-how and expertise, the Plant Maintenance Department off-loads repair tasks to outside agencies by concluding contracts.

Twenty one out of 52 repair contracts concluded for off-loading repair of installed machines during 2003-04 to 2005-06 were examined in course of audit and it was observed that failure to initiate and complete repairs through trade caused machines to remain non-operational for periods ranging from 184-933 days. In most of the cases, it was seen that the actual time taken for completion of repairs was far less than the total period for which the machine was not operational. This discloses deficiencies in the management of offloaded repair jobs.

Recommendations

- Both the dockyards should assess and prescribe dates for repairs and monitor repair jobs against the same.
- The dockyards should closely monitor off-loaded repair jobs so that these are completed expeditiously and equipment put to use without delay.

3.10 Availability of spares and manpower

3.10.1 Availability of spares:

Neither of the two dockyards had adopted the well-established practice of periodically forecasting, provisioning and procurement of necessary spares. Procurement of spares was taken up only when repairs were undertaken.

Audit examined 43 cases of procurement of spares in Mumbai and 35 cases in Visakhapatnam pertaining to 2003, 2004 and 2005 to assess the lead-time involved in these procurements. All these were local purchases. Since such purchases are to be confined only to minimum urgent requirements and not for stocking purposes, they were to be completed on an urgent basis. Audit found that time taken to complete procurements was unreasonably long given that these were required to be undertaken urgently. Findings in this regard are discussed below:

(a) In ND (MB), only one out of 43 procurements was completed within one month. 42 procurement cases took from 31 days to over 360 days to be completed.

(b) In ND (V), no procurement was completed within one month. Time taken to complete the procurement ranged from 90 days to more than 360 days.

The average lead-time taken for procuring spares in Mumbai was 130 days as against 191 days in Vishakhapatnam. In Mumbai, it took more than 90 days to procure spares in 56 *per cent* cases whereas in Vishakhapatnam this happened in 85 *per cent* of the cases.

Local purchase of stores/spares on Cash and Carry[1] (C&C) basis up to Rs 3 lakhs was delegated to ASDs in cases of urgent requirements in order to speed up the procurement process. In ND (V), there were only six C&C cases between 2003-2004 and 2005-2006. In ND (MB), out of 255 C&C cases, only 41 case files were produced to audit. Audit noticed that though the purchases on C&C basis were to be made across the counter, both the dockyards made C&C purchases by resorting to normal local purchase procedure. The lead time for these purchases ranged from one month to 12 months. The average lead time for C&C purchases in ND (Mumbai) was 134 days and in ND (V) it was 98 days. Thus, the very purpose of purchase on C&C basis meant for urgent repair requirement has not been achieved.

Recommendations

- Procurement of spares should be closely monitored so that time taken for the same is minimised.
- The Naval Dockyards should utilise the delegated "cash and carry" powers to expedite procurement of spares so that constraints in repairs are addressed.

3.10.2 Availability of manpower

Both dockyards also attributed delays in undertaking and completing repairs to manpower constraints. The overall sanctioned strength of tradesmen in ND (MB) was 6889. The borne strength was 6035. The performance audit team was informed that the disaggregated position of personnel sanctioned and actually borne on the rolls of ND(MB) was not available. As such, audit was not able to derive assurance that manpower deployed was aligned to the requirements for management of plant and machinery in the Dockyard.

The sanctioned strength of tradesmen in ND (V) was 4552, while the borne strength was 4317 as on 1April 2006. The sanctioned strength of Plant

[1] The procurement on C&C basis was to be made across the counter direct from trade

Maintenance Department (PMD) was only 42 as against which actual manning was 87. Hence the argument of ND(V) that the delays in repair were attributable to manpower deficiencies was without basis.

3.11 Record of Capital Assets

For efficient management of assets, it is essential that complete reliable and reconciled data base of all assets is maintained and periodical physical verification conducted. However, deficiencies in maintenance of records of assets were disclosed in audit as discussed below:

3.11.1 Maintenance of Capital Block Register

As per Rule 87 of Naval Dockyard Cost Accounting Instructions, each department of the dockyard is required to maintain a list of machinery borne on its charge. The dockyard is required to maintain a consolidated Asset Register. The Costing Section of the PCDA in the dockyard is in parallel required to maintain the Capital Block Register (CBR) listing all machines held by the dockyard along with their values. At the end of each financial year both the records of assets should be reconciled.

Audit examination disclosed that:

- ✓ In ND (V), the Defence Accounts Department was not maintaining any CBR. The CBR was instead being kept by the DD (Cost) of the Dockyard. However, this was not being updated regularly and machines declared BER from 2001-02 to 2005-06 had not been removed from the CBR.
- ✓ In ND (MB), Costing Section of PCDA (Navy) responsible for maintaining CBR informed that details of machines declared BER and new machines procured during the period 1996-97 to 2005-06 were not available with them. This put a question mark on the accuracy and reliability of information contained in the CBR maintained by the PCDA.

It was noted during audit that records of assets held were conflicting. For example, in ND (MB), the Asset Register of the dockyard showed the total number of plants and machinery as 2668 whereas the total number recorded in the Capital Block Register was 3185 (March 2006). Similarly, in ND (V), the

Asset Register of the dockyard showed a holding of 3535 machines (June 2006), but the Capital Block Register showed 5199 machines (March 2005).

3.11.2 Annual Stock Verification

Rules require physical verification of assets to be conducted by Dockyard authorities on an annual basis. The rules also prescribe rendering of a report to the PCDA on verification of assets for reconciliation purposes. Both the dockyards were requested to make available Annual Stock Verification reports of Plant and Machinery for the years 2001-02 to 2005-06. However, neither of the dockyards made available the reports to Audit. Evidently the dockyards are not carrying out annual physical stock verification of Plant and Machinery held by them. This is indicative of inadequate internal control in the yards.

Recommendations

- Dockyards should carry out annual reconciliation of plant and machinery held by them and the Capital Block Register maintained by costing section of PCDA (Navy). These records should also be kept up-to-date.
- Annual physical stock verification must be taken up in accordance with the laid down procedures.

3.12. Operation of Plant and Machinery

A primary goal for management of equipment in the dockyard would be that equipment operations should fully support the dockyard in carrying out refits and repairs effectively and with due regard to economy and efficiency.

3.12.1 Monitoring of operations

In dockyards, tasks relating to refits and repairs are allocated to Production centres by way of Work Instructions (WI). These instructions should specify the task for each equipment in terms of target output with specifications, estimated input material, process to be applied, engineering and design details and time allocated for the task and for each process. Operational performance should be monitored and assessed against these instructions. Besides, incidence of delays, reworks, non-conforming products and services should be documented and reviewed for facilitating corrective action.

Audit examination at ND (MB) and ND (V) disclosed the following:

(i) Work instructions did not reflect vital details viz. facts on input material to be used in terms of estimated output, time allocated for tasks and actual time taken.

(ii) Control was compromised on account of either incomplete maintenance or non-maintenance of machine log books. This exposed the dockyards to the risk of instances of delays and defects not being revealed and dilution of managerial accountability at the shop-floor level.

3.12.2 Reworks

Reworks become necessary when original repair works are defective and not conforming to task specifications. As such frequent reworks would indicate suboptimal operations of the Production centre.

In the case of ND (MB), out of 265 cases of reworks involving 25 centres, 119 cases from 14 centres were selected for analysis. It was noticed that the reasons attributed for reworks by the dockyard were lack of skilled personnel, substandard material and non-availability of tools/jigs. In 68 cases the reasons for rework were not recorded. In the case of ND (V), out of 17 centres selected for audit, 07 centres are not maintaining Rework Register and in the remaining 10 centres, two have opened Rework Registers only recently. Reasons attributed for rework in rest of the seven centres were poor workmanship and substandard spares and in one centre it was due to defective casting.

Inadequate maintenance of records of rework led to Dockyard authorities not analysing and controlling instances of defects leading to reworks.

Recommendations

- Work instructions should contain all necessary details to facilitate effective monitoring of plant and machinery operations.
- Each centre should maintain complete record of rework in a prescribed and uniform format.

3.13 Impact on refit and repair tasks

The primary task of dockyards is to undertake refits and repairs of naval vessels. The position of the number and value of refits completed during 2001-2006 in respect of Naval Dockyards, Mumbai and Vishakhpatnam were as follows:

(Rs In crore)

	ND (MB)				ND (V)			
Year	Expenditure				Expenditure			
	No. of Refits	In-house repairs	Off-loaded repairs	Total	No. of Refits	In-house repairs	Off-loaded repairs	Total
2001-02	29	299.08	36.26	335.34	24	52.50	25.12	77.62
2002-03	33	324.25	48.14	372.39	29	153.17	7.67	160.84
2003-04	31	154.44	59.76	214.20	32	104.15	11.98	116.13
2004-05	30	244.71	58.38	303.09	27	237.66	27.05	264.71
2005-06	34	250.39	45.79	296.18	29	Annual Works & Production Accounts not yet prepared.		
Total	157	1272.87	248.33	1521.20	141	-		

In ND (MB), out of 157 refits completed during the years 2001-2002 to 2005-2006 only 99 refits were completed in time and in the remaining 58 cases the delays ranged from 6 days to 462 days. In the case of ND (V) out of 141 refits completed only 82 refits were completed in time and in the remaining 59 cases the delays ranged from one day to 102 days. Thus in most cases refits took more time than planned. The delays are caused by a complex interplay of factors such as lack of specific capabilities in terms of men and machinery, reworks, increase in scope of work, non-availability of dry docks and shortage of spares. However, on account of inadequate record keeping, the impact of machine availability and operation on refit schedules were not amenable to meaningful assessment. Yet, given the frequency and extent of downtime observed during breakdowns and the shortfall in replacement of old, aged and BER machines disclosed in this report, it would be difficult to rule out impact.

Conclusion

Naval dockyards have the key responsibility of ensuring that naval vessels are in a state of optimal operational preparedness. The dockyards discharge this responsibility by undertaking refits and repairs of these vessels. They additionally endeavour to ensure that these tasks are carried out efficiently and effectively and with due regard for economy. Dockyard equipment plays a

critical role in enabling the dockyards achieve their primary tasks. Of specific concern are the shortcomings with regard to implementation of appropriate preventive maintenance schedules and in monitoring machine use and performance. There is also a need to ensure basic but comprehensive record keeping so that credible reports are generated, disseminated and used for the purposes of control. Acquisition and replacement of equipment should be planned and executed as part of a conscious exercise to optimise, augment and upgrade facilities and equipment, which not only meets current refit schedules but also is capable of bringing about enhancements and improvements.

The matter was referred to Ministry in November 2006; their reply was awaited as of January 2007.

(DEEPAK ANURAG)
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New Delhi
Dated: 14 Mar 2007

Countersigned

(VIJAYENDRA N. KAUL)
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New Delhi
Dated: 14 Mar 2007

GLOSSARY

1.	AGM (YS)	ADDITIONAL GENERAL MANAGER (YARD SERVICES)
2.	ASD	ADMIRAL SUPERINTENDENT
3.	BDM	BREAKDOWN MAINTENANCE
4.	BE	BUDGET ESTIMATES
5.	BER	BEYOND ECONOMIC REPAIR
6.	BPs	BOARD PROCEEDINGS
7.	C &AG	COMPTORLLER AND AUDITOR GENERAL
8.	C&C	CASH AND CARRY
9.	CBR	CAPITAL BLOCK REGISTER
10.	CDL	CENTRAL DOCKYARD LOBERATORY
11.	CRV	CERTIFIED RECEIPT VOUCHER
12.	DD(COST)	DEPUTY DIRECTOR (COST)
13.	DFM	DIRECTORATE FLEET MAINTENANCE
14.	DGNP	DIRECTOR GENERAL NAVAL PROJECTS
15.	DODY	DIRECTORATE OF DOCKYARDS
16.	DPRO	DIRECTORATE OF PROCUREMENT
17.	FLM	FIRST LINE MAINTENANCE
18.	FY	FINANCIAL YEAR
19.	GM(T)	GENERAL MANAGER (TECHNICAL)
20.	HLB	HIGH LEVEL BUDGET HOLDERS
21.	LAN	LOCAL AREA NETWORK
22.	LPR	LOCAL PURCHASE REQUISITION
23.	MHC	MACHINE HISTORY CARD
24.	MAST	MANAGER AUXILARY & STEAM
25.	MBEF	MANAGER BOILER ERRECTION & FABRIACTION
26.	MDAG	MANAGER DIESEL AND GAS TURBINE
27.	MELE	MANGER ELECTRICAL
28.	MEPS	MANAGER ELECTRICAL POWER SYSTEM
29.	MFAB	MANAGER FABRICATION
30.	MGES	MANAGER GENERAL ENGINEERING STEAM

31.	MID	MANUFACTURING & INDIGENISATION DEPARTMENT
32.	MIS	MACHINERY INFORMATION SYSTEM
33.	MOD	MINISTRY OF DEFENCE
34.	MOUT	MANAGER OUTFITTING
35.	MPM	MANAGER PLANT MAINTENANCE
36.	MSAX	MANAGER SUBMARINE AUXILARY
37.	MSYS	MANAGER SYSTEMS
38.	MWEA	MANAGER WEAPONS
39.	MWI	MAINTENANCE WORK INSTRUCTIONS
40.	NHQ	NAVAL HEAD QUARTERS
41.	NLAO	NAVAL LOCAL AUDIT OFFICER
42.	NSRY	NAVAL SHIP REPAIR YARD
43.	OEM	ORIGNAL EQUIPMENT MANUFACTURER
44.	PPM	PLANT PREVENTIVE MAINTENANCE
45.	P&M	PLANT & MACHINERY
46.	PAC	PROPRIETORY ARTICLE CERTIFICATE
47.	PCDA (NAVY)	PRINCIPAL CONTROLLER OF DEFENCE ACCOUNTS (NAVY)
48.	PLL	PERMANENT LOAN LEDGER
49.	PPM	PLANNED PREVENTIVE MAINTENANCE
50.	RE	REVISED ESTIMATES
51.	ROP	ROLL-ON – PLAN
52.	SOC	STATEMENT OF CASE
53.	STOPs	SHORT TERM OPERATING COST PLANS
54.	USSR	UNION OF SOVIET SOCIALIST REPUBLICS

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